Electrical Contracting

FEBRUARY

1935

SPORTSMANSHIP is that quality within us which insists that we play the game according to the rules no matter what the outcome.

Why cannot the rules of business hold for a man the same respect as do the rules of sports? Why would we be ashamed to admit that we had won a game unfairly, yet boast of how we had out-smarted a competitor or skinned a buyer?

The construction industry will never adequately compensate itself, or serve the public, so long as any important number believe that the only way to do business is by methods that never for one moment would be permitted by sportsmen.

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Get in on This Profitable Business

The copper-bronze floodlight, accepted as standard by many large oil companies

The inexpensive open-type floodlight — many thousand have been sold in the last year

Sell G-E Floodlights

HERE is a profit-making line of equipment that can be sold in a variety of places. Take, for example:

FILLING STATIONS—sell floodlights on the basis that they will increase both the day and the night business of a station 20 to 25 per cent. (Publications GEA-1919 and GEA-1992 give these figures and recommend equipment.)

PARKING FIELDS — an argument for such operators is that floodlights will make their fields more attractive, increase their business, make their work easier, and assure their customers greater protection.

SOFT-BALL FIELDS — Soft ball will be even more popular this summer. It is a night sport that depends on good lighting for its success. Floodlighting is the most efficient and most satisfactory method of lighting all sports.

Among General Electric floodlights, the long-lived, inexpensive, open-type AL-45 (for wattages up to 1500) and the high-grade, copper-bronze, enclosed AL-31 (for 1000-watt lamps) are very popular for these applications.

Let us help you get this lighting business. Our floodlighting catalog, GEA-1865, may be useful—write General Electric, Dept. 6A-201, Schenectady, N. Y., or the nearest G-E office, or G.E. Supply Corporation.

INSTALL G-E TIME SWITCHES

G-E time switches will be profitable. You will have no expensive service calls to wind clocks, set time, lubricate bearings, and free sticky contacts. Installed as a part of any wiring job, they often bring repeat orders and new business because of their reliability. These switches stay sold and keep selling for you.

INSTALL G-E CABLE

With floodlights, transformers, and many other equipments, the sale of G-E cable will make profits for you and will assure your customers a permanent installation. You can get G-E insulated cable in every type, size, and voltage. Illustrated are three types for burying directly in the ground.

500-131

GENERAL ELECTRIC

VOLUME 34
NUMBER 4

electrical contracting

WITH WHICH IS CONSOLIDATED THE ELECTRAGIST and ELECTRICAL RECORD

S. B. WILLIAMS, Editor F. J. SEILER, Assistant Editor
G. W. SUTTON, Manager

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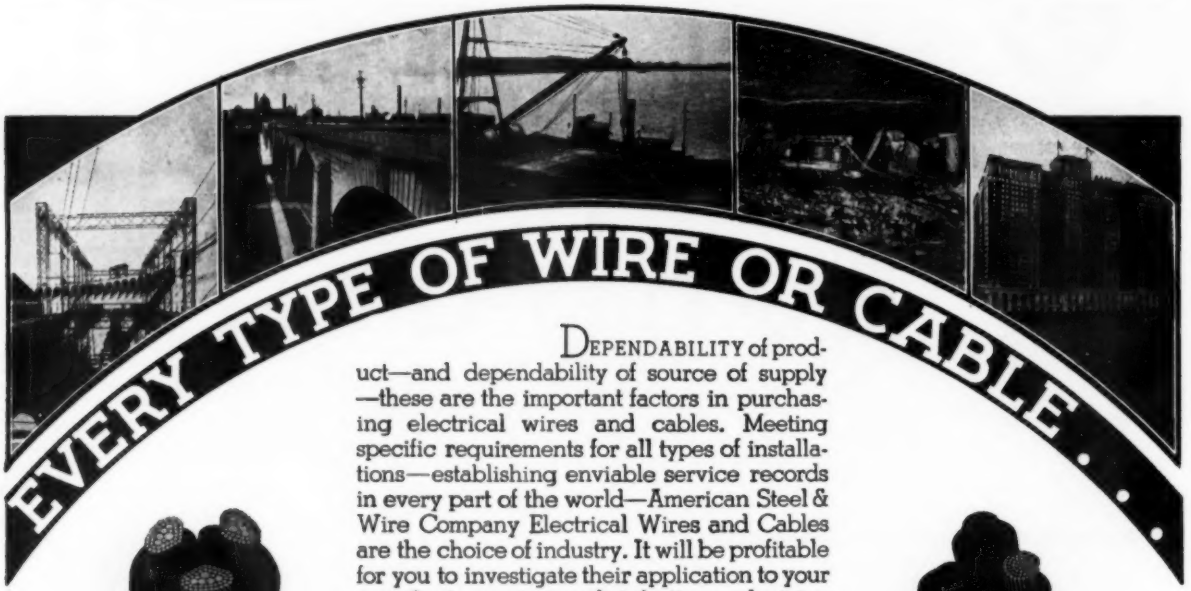

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DEPENDABILITY of product—and dependability of source of supply—these are the important factors in purchasing electrical wires and cables. Meeting specific requirements for all types of installations—establishing enviable service records in every part of the world—American Steel & Wire Company Electrical Wires and Cables are the choice of industry. It will be profitable for you to investigate their application to your specific transmission, distribution and wiring problems.

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ELECTRICAL WIRES AND CABLES

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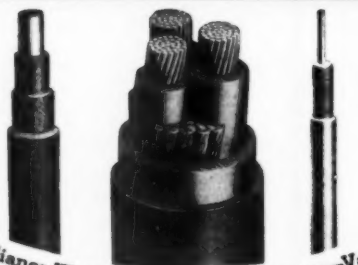
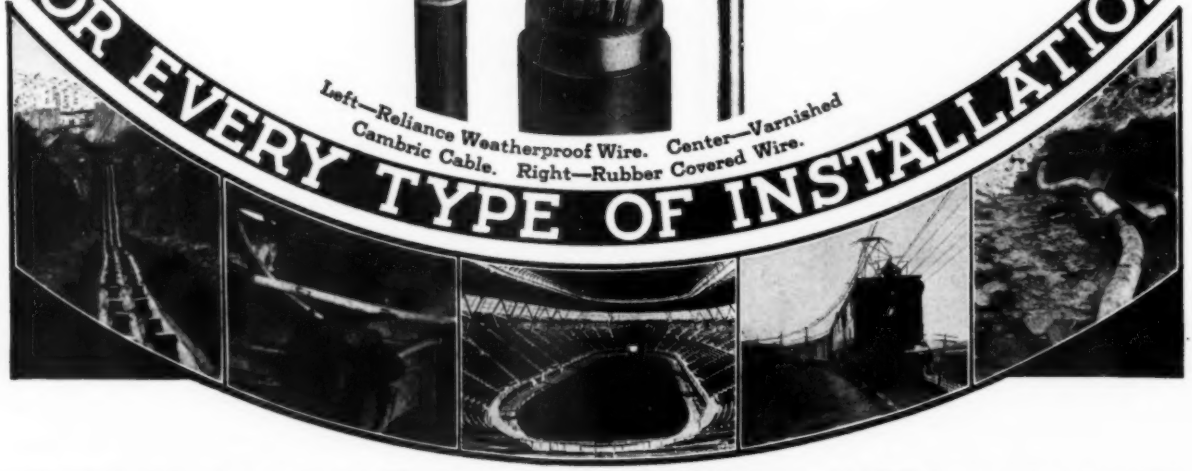


Left—Reliance Weatherproof Wire. Center—Varnished Cambric Cable. Right—Rubber Covered Wire.

FOR EVERY TYPE OF INSTALLATION



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Evidence

FOR a number of months ELECTRICAL CONTRACTING has been running a series of illustrated pages under the caption "Wiring Conditions Found in Factories." In each issue there appears photographic evidence of the actual conditions found by a member of the editorial staff. It is the intention of the editors to picture in each issue the conditions in a plant making a different kind of product.

A STUDY of these pages will show (1) obsolete wiring, equipment and appliances, (2) inadequate wiring, (3) "temporary" wiring still in use years after it was put up, (4) make-shift work, tied up switches, taped in plugs, stappled cord wiring for motors, (5) badly overloaded circuits, (6) additions to original wiring by incompetent people, (7) unprotected wiring and equipment in hazardous locations, (8) badly worn and deteriorated insulation, broken or missing fittings, lack of bushings, etc., (9) improper grounding and exposed live contacts, (10) unfused circuits, (11) poor electrical housekeeping.

Since these are not unusual conditions it must be obvious that the occupants of premises so wired are not getting the best service out of their electrical equipment. Such conditions undoubtedly slow up production, give rise to accidents and, what is worse, present an ever present fire hazard that might break out at any time and completely interrupt the business.

THESE pages of evidence are being presented each month by the publishers of ELECTRICAL CONTRACTING to stimulate the industry to action.

The occupants of such unsafely wired premises have a right to expect the electrical industry to point out the hazards and to show the way to correct them. No matter what we may think, this is not a duty that can be shirked.

Also, with such conditions existing in thousands of factories there can be little excuse for unemployment in the electrical industry.

Because there was work involved our industry has hesitated to promote reinspection. We have been afraid that the effort might be branded as a selfish one.

That might have been a good policy some time ago, but the administration at Washington has now set a different example. To promote work is now a popular appeal.

Surely to provide work through reducing life and fire hazards should receive support from everybody.

IT is not the purpose of this editorial to imply or suggest that reinspection and the subsequent correction of defective wiring be achieved by force. We do believe that there is enough evidence available to educate the public and to sell the owners of poorly wired properties. Some of the obsolete wiring cannot be condemned on reinspection, but a sales minded inspector could in most instances convince the owner of the advisability of replacement.

In some way the inspectors, manufacturers and contractors should work together to correct the vast amount of obsolete, improper and defective wiring that is in existence. If only 10 per cent of the aggregate amount of such wiring were corrected in 1935 it would almost double our volume of wiring.

Is it not worth going after?

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THIS HOUSE IS HAUNTED!

There's many a good house that's haunted — haunted by wiring installations that would give any self-respecting contractor the creeps. Over-loaded circuits. Double and triple sockets. Fearful home-made connections. ¶ The interesting thing about these haunted houses is that there are so many. You'll find them right in your own neighborhood. Every such house is a prospect for a profitable rewiring job —to the electrical contractor who will do some constructive *selling*. ¶ Question—how to start? It's not hard to get permission to "look around" at wiring in customers' homes. When you've spotted a "haunted" house, arouse the owner's interest in the comforts and conveniences he can have with better electrical work. "Build up" your sale. ¶ Graybar has prepared an interesting booklet to help you with your selling job. It is written from the viewpoint of your prospective customer—describes home *check-up* suggestions in detail. Ask us about it. Write—or mail the coupon below.

THERE'S MONEY IN "HAUNTED HOUSES" —THIS BOOKLET CAN HELP YOU FIND IT!

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VOLUME 34
NUMBER 4

electrical contracting

FEBRUARY
1935

WITH WHICH IS CONSOLIDATED THE ELECTRAGIST AND ELECTRICAL RECORD

tools turn the tide

by John Wise

We all know that Uncle Sam's cavalry had a tough time keeping order out West along in the eighteen-sixties and seventies. There were scads of Indians and darned few soldiers, and whenever the redskins pulled a fast one, it was up to the boys in blue to either catch the ringleaders or bury 'em. Sometimes the Indians didn't feel like being chased, and the fact that they never fought unless they were at least five to one made it plenty dangerous. Uncle Sam grew tired of seeing his boys battling against such heavy odds, so he bought 'em a brand new set of tools, better than they ever had before.

Of course, the Indians were not notified, and the first time they heard the bad news was when 350 of 'em jumped 60 cavalrymen out in Wyoming. You know the Indian style was to swoop down and draw a volley, then they would try to rush before all the boys could reload. That's what this gang did, but they hadn't come 100 feet when blam! they got a second blast. They were surprised, but figured it was just quick loading and came on. The third volley pulled them up and the fourth turned them, then the soldiers ran 'em ragged, killing nearly a hundred.

You see, the cavalry outfit was armed with the new repeating carbines, entirely strange to the Indians, who were naturally astonished at the succession of volleys. They probably thought it was some more of the White Man's Magic, because they had never seen anything but the single-shot rifles which they carried themselves. Anyhow, the new guns made the soldiers work much easier and paid for themselves in a short time.

The moral of this is that the fellow with the up-to-date tools can do more and better work, no matter what line he is in. This applies to all electrical contractors. When

the job is started and all the enemies—waste, lost time, damage, etc.—come charging in, modern tools will knock 'em off like flies. Furthermore, they will help you set a standard of work that will please the customers and bring repeat business.

During the depression, with its enforced economies, most of us have fallen off in our buying of newly invented tools, and the replacing of old ones which have petered out. Maybe we *could* get along that way when there was a shortage of jobs, but now that more work and keen competition are here again, our men should have the advantage of strictly modern weapons.

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Engineered Industrial Rewiring

1—Lessens interruptions in change-overs.

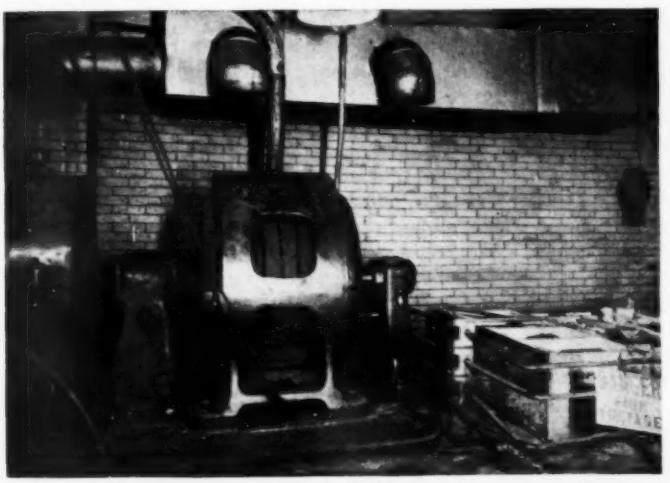
2—Permits economical feeder designs.

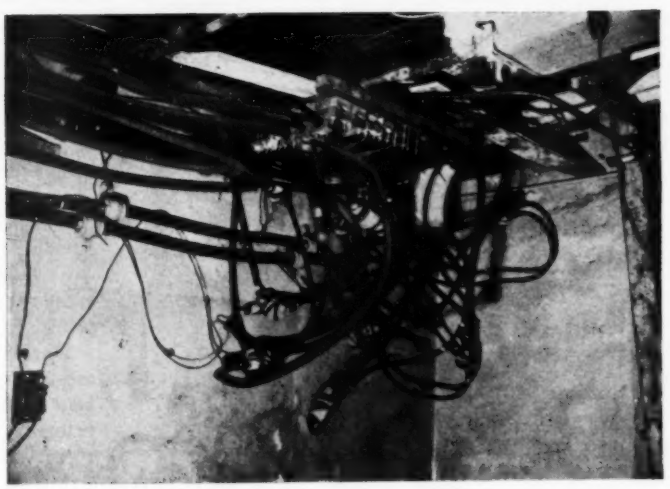
3—Establishes logical distribution centers.

4—Reduces future maintenance problems.

LARGE industrial modernization jobs present to the industrial contractor many problems in feeder design, correct distribution points, and uninterrupted change-overs. A large dairy products and ice-cream plant operated by the Reid-McJunkin Dairy Company, Pittsburgh, Pa., as a unit of the National Dairy Products Company, is just such an example. The final arrangement of feeders, centralization of distribution and the provisions for future requirements brought about in this operation indicate the painstaking engineering responsibility which must be assumed by one engaging in this class of work.

The modernization program involved the removal of steam and gasoline engine generators, boilers and obsolete ice machines, the remodeling of the lighting, a large general office space, as well as the installation of several new batteries of motorized machinery. A new wiring system was needed to replace an antiquated





(Above) The temporary 225 k.w. generator leads may be seen on the floor, while in the background are the new cables, stubbed-up from permanent ducts which are concealed under the floor to the rear of the M-G board at the right.

(Upper right) In rewiring this 225-k.w. 115-volt d.c. motor-generator set, a real hazard is being eliminated. The "temporary" 2,300-volt open motor wiring may be seen at the lower right. The two new conduits for this motor are shown stubbed down in the background.

(Lower right) The removal of a 150-k.w. gasoline engine driven generator and its switchboard left this group of open feeder circuits to change-over to permanent conduit wiring, and new distribution centers.

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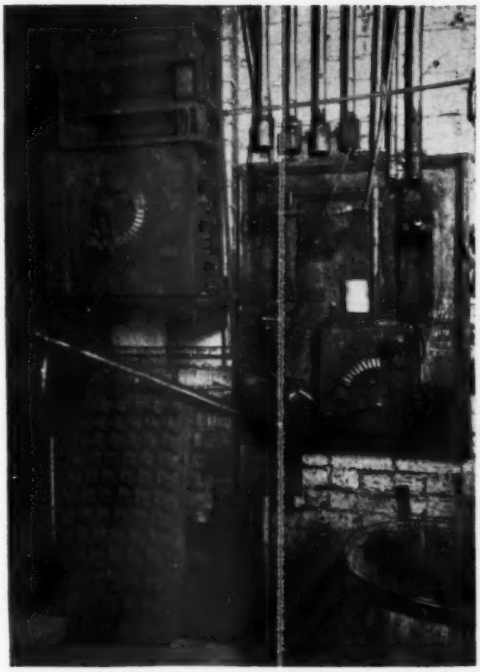

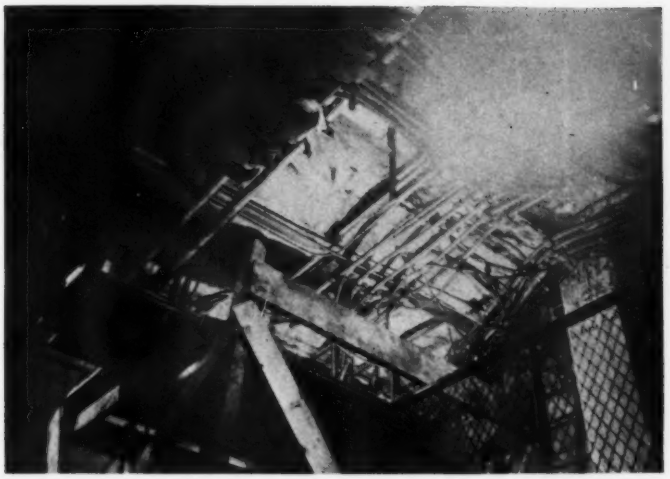

Some of the patched-on types of wiring which are being replaced.

A problem in open feeders on a 24 ft. ceiling above a "hot" 2300-volt feeder switchboard. These come out when all load connections have been transferred to the new feeder system.

Obsolete control equipment in the boiler room which has only weeks to "live" before becoming relegated to the junk heap.

system which had been used with the equipment that was being abandoned, since the maintenance costs of the old electrical system in this plant had become a serious factor. This was due to overloaded feeders, worn-out distribution equipment, poor contacts, deteriorated insulation, inaccessible locations of feeder-tap fuses, and the frequent molestation of open wiring in overhauling the maze of piping employed in such a plant. This system was to lend itself to a complete ultimate changeover to a.c., but be partially supplied from 125-volt d.c. motor generators during the interim.

The particular engineering and installation problem, therefore, became one of feeders and distribution equipment to meet these complicated conditions, while keeping the plant in operation. The design could not employ the existing scheme of random panel locations and sub-feeder taps. In order to provide economical maintenance a new centralized distribution plan, supplied with new feeders of uniform sizes, was adopted.

Centralized Distribution Centers

As a result of this policy, thirty-five obsolete lighting panels were scrapped and replaced with twelve larger panels of the circuit-breaker, safety type. Over 200 motors, ranging from ½ hp. to 150 hp., were rewired, including new feeders, circuit-breaker distribution centers and branch circuits. The rewiring was done for a.c., although many d.c. motors are being retained and operated from two 225-kw. motor-generators.

Lighting circuit control in this plant which was filled with various processing machinery located in many separate rooms was considered mainly a departmental matter. Local switching was therefore found most desirable for the one or more reflector units of a room. The distribution centers were, therefore, located for accessibility and simplicity in maintenance by qualified persons, rather than for the panel control of specific circuits. Likewise the new locations were decided upon for isolation from dampness and corrosive vapors. In contrast, the original installation consisted of thirty-five panels scattered at various miscellaneous points. Some were not accessible, some were in damp, troublesome locations, and the system of patched-on sub-feeders supplying them required fuse boxes to be likewise located at out-of-the-way places which made for expensive delays in restoring outages. With twelve new panels located at logical, accessible and dry places a further advantage was possible in the simplified feeder system.

A somewhat similar condition prevailed in the distribution system for smaller motors. Except for large units, which by themselves employed heavy feeders, the smaller units from 20 hp. and lower were distributed from central distribution points for

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Even this apparently workable distribution center must go, in the interest of safety, maintenance reduction and centralized distribution.

the same reasons which governed the selection of lighting panels and their feeders. Thus, it was possible to dispense with a maze of small fuse boxes located at every conceivable point on columns, beams, walls and even upon ceilings. The result of this complete abandonment of existing patched-on wiring is expected to greatly reduce maintenance and confusion.

Feeder Layout

Before the Raphael Electric Company, the electrical contractors on the job, could commence their new wiring layout, a complete wiring survey and plan of the old systems had to be prepared. This covered the 6-story plant comprising over 150,000 sq.ft. of space, and involved running down and tracing out a feeder network of open wiring to all 115-volt d.c. motors and lights. This network was supplied from three generators, two 200-kw., steam-driven, and one 150-kw. gasoline-driven, which were located at different points in the plant. Another wiring system supplied 3-phase, 220-volt a.c. for various motors, while a third system served several large 2,300-volt motors.

A new wiring system layout comprising riser and floor plans was prepared from the data obtained from the existing system survey and plan. This new layout involved the use of one or more sets of three 500,000-c.m. feeders in 3-in. conduit to all new distribution center locations. This standard for heavy feeders allowed for future load increases, power-factor variations, and also anticipated the final complete changeover of lighting and d.c. motors from temporary motor-generators to the permanent a.c. supply.

Uniform 3-in. feeder conduit sizes were considered most economical due to:

1. Uniformity in racking and hanger designs.
2. Standard templates for all junction boxes and cabinets.
3. Standard calculations for making bends, sweeps, doglegs and off-sets in the conduit installation.
4. Less handling and changing of the bending and cutting tools.
5. Lessened scrap or wasted conduit ends.
6. Fewer sizes of minor accessories to handle, such as locknuts, bushings, nipples, straps and hangers.

The general use of 500,000 c.m. feeders was likewise considered most economical, due to:

1. Exact capacity of 400 amp. being a standard protective device rating.
2. A handy size to handle.
3. Could be paralleled for exact 800-amp. rating.
4. Less handling of various reel sizes.
5. Avoided confusion in future maintenance or alteration calculations.
6. Minimum waste from left-over lengths.

Since much of the original wiring was distributed from the three generator switchboard panels, the new layout encouraged a centralized main distribution center for the ultimate tie-up of all feeders to an a.c. network. Therefore, a sub-distribution switchboard was designed for taking over the three abandoned d.c. generator feeder panel circuits. This required new feeders from the two temporary d.c. motor generators, and new sub-feeders to all temporary d.c. loads. Likewise, new a.c. main and sub-feeders were required for all the changeover motors. The design of the board, distribution centers and feeders was arranged for ultimate operation on one common a.c. power system. A further provision permits the lighting system to be distributed from a separate a.c. feeder distribution section from its own transformer bank, although at present the system must operate on 115-volt, 2-wire d.c.

A new circuit breaker feeder distribution center which must be cut-in on circuits without interruption. The enclosed framework for a 4,000 amp. bus bar feeder may be seen above the board.

A 4,000-amp. 3-phase sub-feeder from the remodeled main switchboard to the sub-distribution switchboard was designed in metal enclosed bus-bar construction, after careful comparative estimates revealed this method to cost only 60 per cent as much as conduit and paralleled cable feeders of like capacity.

Changeover Planning

In converting to the new wiring system, a definite temporary wiring program was arranged so as to avoid overtime or plant interruptions. Here the two wiring plans (old and new systems) were useful in determining the type, capacity and most suitable connecting points to be established for temporary cables. Often a section of an abandoned open wiring feeder system could be employed to good advantage as a temporary feeder for another department. Due to the old feeders being clearly indicated upon the old work drawing, size, routing and whether clear of all original loads was easily determined.

It was likewise found that considerable time could be saved by checking off each changed-over motor unit from the old to the new wiring system. Thus little trouble arose through failure to provide for isolated motors or lighting circuits in the new system layout.

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Modernization Possibilities in 25-Year Old Apartment Building

A 32-family apartment modernization project which involved an electrical installation of $4,000, or $125.00 per family can be considered a fair indication of the modernization possibilities a quarter of a century after the original installation. This job, which was recently completed by the Sterling Electric Company, Minneapolis, Minn., resulted in a total of 1,007 wired outlets being installed to replace a system composed of 124 outlets.

An insurance company which owned this property was unable to retain its tenants on a paying basis. Built 25 years ago, of substantial fireproof construction, this property lacked the modern conveniences that are now in demand. Two original buildings, each arranged for eight families, were therefore remodeled and joined together to provide thirty-two modern apartments.

These electrical modernization operations went on while other remodeling work was done and served to eliminate many unsightly conditions which would otherwise have detracted from a pleasing finished appearance. Safety, convenience, adequacy, efficiency and ornamentation were brought up to 1934 standards.

Apartment Modernization High Lights

1909 Obsolete Version	Equipment	1934 Modernized Version
Separate service entrances at front of each building entering at fourth floor.	Services	One common service for combined twin building at rear and entering at basement level.
Old service cables spanned from street pole to front of building with unsightly brackets.	Aerial Spans	New service cables were spanned from alley pole to rear of building with modern compact brackets.
Unsightly, unsafe and inadequate service and meter switches cluttering front hall spaces.	Meter Equipment	Neat, compact and safety type service and meter switches neatly installed in basement areas.
Obsolete wooden fuse cabinets defacing walls of occupied areas.	Cabinets	Compact fuse cabinets for 2 circuits to each apartment attached to meter switch.
An unsightly accumulation of obsolete mail containers cluttered about the halls.	Mail Boxes	Modern regulation type brushed brass letter boxes in two 16-compartment gangs mounted flush in walls.
A skeleton system of conduits was connected to a meager number of original outlets.	Circuits Feeders	A completely new and concealed system, with new wire throughout for feeders and circuits.
No wired outlets provided, therefore appliances or portable lamps were connected to a system of dangerous cord wiring.	Convenience Outlets	Each of 32 apartments was provided with 9 convenience outlets, with 12 installed in public spaces.
All outlets were socket switched by key or pull chains.	Wall Switches	4 wall switches were provided in each apartment, and also 11 for public controls.
Wires strung open about the halls and tacked around the apartment woodwork.	Telephones	Electrical metallic tubing was concealed to a flush outlet in each apartment.
No signals previously provided.	Bell System	A 2-call flush buzzer was provided for each apartment with separate push buttons at letter box and service door.
No electrical equipment used.	Elevator	5 H.P. 3-phase motor wiring and service entrance.
No electrical equipment used.	Heating Equipment	2 H.P. stoker motor wiring.
Obsolete and defective socket fixtures with deteriorated wiring.	Fixtures	Modern neat appearing fixtures, including 6 ornamental exterior entrance brackets.

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Efficiency in Moving a Small Industrial Plant

A WEEK-END factory moving job which incurred no overtime electrician labor was recently executed in Toledo, Ohio. Numerous individually motored machines were placed in operation by 10 o'clock on the following Monday morning, or within two hours after regular straight-time work was commenced. This speedy service was rendered without the electrical contractor having made preliminary motor circuit wiring provisions, and without an expensive outlay for temporary wiring.

The Toledo Mold Company, a small industrial concern, desired to move into newly constructed quarters without interrupting production. Since a definite machinery location scheme could not be settled upon in advance, the A. F. Preeter Electric Company installed a plug-in type bus bar feeder system in the new structure ahead of the moving date, complete with a main feeder and service connections.

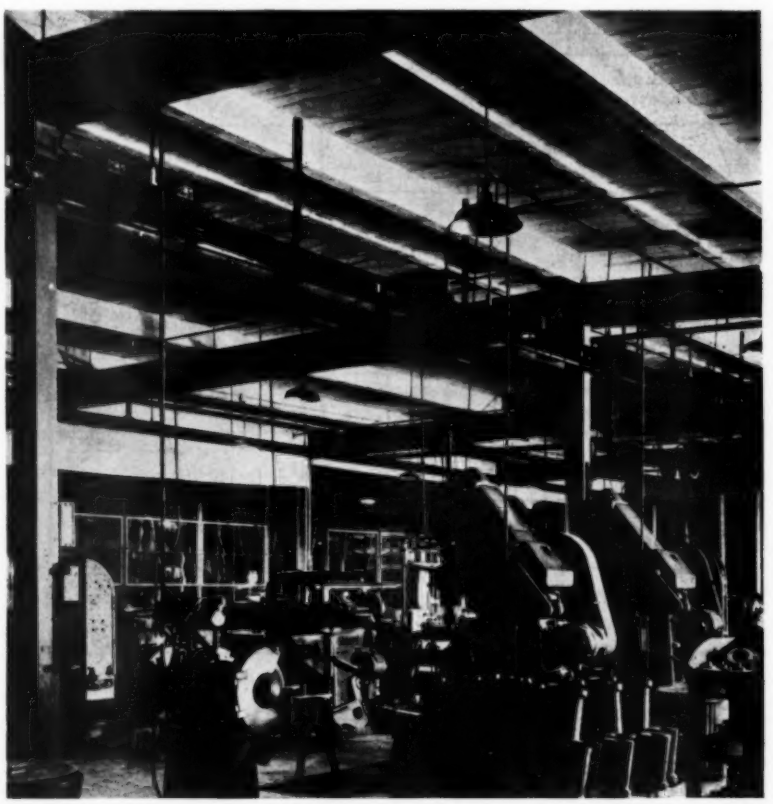
On the Monday morning after the moving in had taken place a crew of six wiremen connected 15 motors, ranging from 1 h.p. to 7½ h.p. with temporary wires to their respective plug-in devices within a period of two hours. After plant operations had been thus established, these motors were then wired up one by one with permanent rigid conduit, to the bus bar feeder. The original temporary motor circuit wires, which were purposely cut slightly long, were pulled into the conduit for permanent use, thus resulting in a minimum waste of wire.

This system as now installed readily permits unrestricted changes or future additions (up to the safe capacity of the mains) due to the avoidance of splice boxes, sub-feeder circuits or possible limitations in distribution center facilities. By means of the fused plug-in devices which are provided with the bus feeder system it is possible to provide motor connections quickly without disturbing other motors that are in operation. Where immediate operations are desired a temporary wiring connection may be made to the fused outlet while the permanent conduit is being installed.

The bus feeder installation was employed instead of a conduit feeder scheme which was originally drawn up to use three sub-feeders to be installed overhead and lengthwise of the factory, with steel splice boxes for the future motor circuits to be inserted at frequent intervals in each run. An 80 ft. run of Bull Dog Bustribution feeder was used which was located about 12 ft. above the floor, and placed lengthwise in the centerline of the factory area. Three ¼ in. by 1 in. horizontal flat-wise busses were used, these being connected at their mid-point with three 400,000 c.m. cables. The bus housing is designed to receive 30, 60 or 100 amp. fused power plugs for each 12 in. of its total length. These plugs are of a design to operate as an externally operated switch, yet they permit attachment thereto with rigid conduit.

Because 23 man-hours of labor was saved by using the busbar layout, the higher material cost increased the wiring contract by only $148.00 from an original figure of $2,433.00.

A total of 28 man-hours labor was required to unpack and assemble the 10 ft. bus bar feeder sections, and install them in place ready for the plug-in devices. This time included punching 20 holes in the flanges of the steel and making up 10 angle iron hangers. Each plug-in device averaged 0.25 hour mounting time in addition to the foregoing costs.



Twenty-three hours of installation labor were saved by using overhead bus distribution.

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C. K. Cregier, Chicago's chief electrical inspector (left) and D. J. Talbot, assistant chief inspector. Their staff comprises 35 district inspectors, 5 sign inspectors, 7 special (selling and cut-off men), 1 theatre specialist, 1 fire investigator, 1 for carnivals and conventions, 2 public utility overhead and underground service, 2 factory and maintenance, 2 prosecutors, 2 laboratory men, and 30 clerks and stenographers. This staff of 90 persons requires an annual payroll of about $250,000, yet department revenues are about $50,000 in excess of expenditures.

How Chicago Curbs Bootleg Wiring

CORRECTING Chicago's bootleg wiring evils is somewhat akin to the enforcement of prohibition. Unemployed wiremen, tinkerers, janitors and handy men find many receptive ears to their solicitation for wiring jobs in this great city's wide area of shops, taverns, industrials and flats. The public all too frequently avails itself of make-believe depression bargains in shoddy wiring.

To cope with this situation, the Bureau of Electrical Inspection adopted a plan which has become known as the "cut-off" system. All wiring that is found to have been installed without permit, unless corrected and permit secured within ten days after discovery, is disconnected from its service feeder or circuit by an inspector and sealed out of use. A red warning tag is placed at the cut-off point and a written notice is given to the occupant. In nine months' time over 3,000 cases have been put through this procedure. According to C. K. Cregier, chief inspector, the results have been more satisfactory than any previous method employed in this work. In addition, this procedure has held down expenses in keeping with budget curtailment.

Few laymen know what constitutes safe wiring. Many, however, who know that a license is required for electrical wiring become a party to bootlegging activities. Under the forceful procedure now followed, violation of Chicago's electrical ordinance has become known by a new lay term,"An electrical ticket." Its functions are considered comparable to a "traffic ticket," since regular prosecution procedure is embodied to enforce the "cut-off"system. Definite schedules of fines are set for breaking a seal and using a circuit or portion of a circuit that has been legally "padlocked." Owners and shopkeepers therefore are quick to employ a licensed electrical contractor to correct violations, having seen the effectiveness of this procedure in a neighbor's shop or flat. They know that the cut-off will be made according to schedule, and that it is not worth while to risk a fine for using the system once it is condemned.

Few illegal wiring jobs are abandoned, although not many of them are found to have been done in an approved manner. It is claimed that over 90 per cent of the cases of record were rewired by licensed contractors. Less than 10 per cent were removed because the owners did not consider the outlets to be of sufficient importance to warrant an expenditure for an approved wiring job. This would indicate that such wiring as the public actually desires has a service value for which it feels justified in paying a fair price for its approved installation, over and above whatever amount had already been expended for a non-approved job.

Dummy plug fuse devices are inserted and sealed in the cutouts of circuits so as to prevent the use of current until wiring corrections are completed.

Aids Reinspection

Although the cut-off plan was originally planned only as a remedy for bootlegging abuses, it has been adopted also for speeding up the correction of old wiring systems that have become hazardous. After a reinspection is made a letter is sent to the owner or user which describes the conditions that appear upon a special reinspection report form. After this procedure has failed to produce results the sealing off of hazardous conditions is followed as with bootleg wiring.

Bootleg wiring is located as the result of (1) the vigilance of district inspectors, (2) cooperative reports from licensed electrical contractors and their employees, (3) likewise from the utility field force, and (4) miscellaneous reports, inquiries and complaints from tenants, business

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rivals, salesmen, city employees, insurance adjusters and other building industry groups.

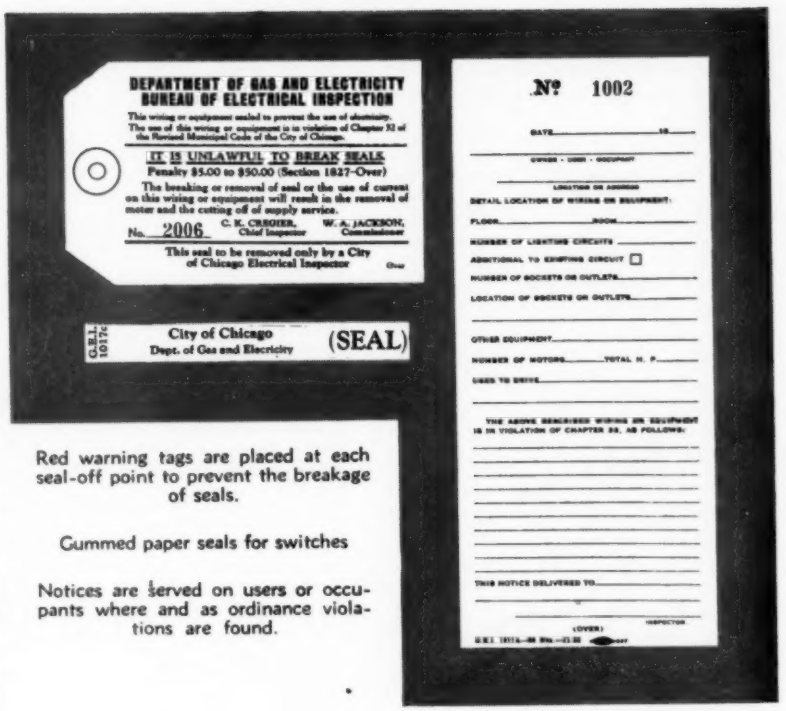
Each inspector is expected to produce a reasonable quota of investigations of his own accord in addition to the regular permit inspections and special investigations that are given out to him daily from the office. Thus the two-fold work of inspection and reinspection for hazards due to obsolescence or overloading is coordinated with a steady campaign against bootleg or illegal wiring.

Immediate Notification

The quick correction of bootleg work hinges upon the psychological effect of the "electrical ticket." Each inspector carries a book of violation notice forms, arranged to be issued in triplicate. The owner or occupant is given the original upon which a description of the violation has been written. The reverse side of this notice stipulates a definite 10-day period in which the owner must remove the condition, or have a licensed electrical contractor secure a permit for the necessary corrections. Before ten days have elapsed a "selling crew" of two men calls at the premises, provided a correction permit has not yet been issued. This crew attempts to bring about voluntary correction by explaining the various aspects of non-standard wiring, such as fire hazard, life hazard, possible increase in fire insurance rates, inefficient or inadequate service. If such efforts fail the record is referred to the "cut-off" crew for action at the proper time. A new form of notice has been developed as a final warning prior to cut-off, by which the owner is notified that no liability may be placed upon the Bureau of Electrical Inspection or the city government for the spoilage of perishable commodities, or for other losses sustained as a result of cutting off defective or illegal wiring.

Seal-Off System

Illegally wired systems and reinspected old systems are both subjected to cut-offs when no corrective action is taken. If several circuits on a sub-main are involved, then that sub-main is opened, or the panelboard fuses are removed and the panelboard door sealed shut. If only one or two branch circuits of a group are involved, dummy plug fuses are inserted to replace the regular fuses. The dummy fuses are hollow and have a swivel top. They can be inserted or removed only with a socket wrench that will reach a stud at the bottom and inside of the hollow shell. After being firmly inserted a blind cap is clipped into the swivel top window of the dummy fuse. A sealing wire which must be broken in order to remove the dummy plug fuse, is then threaded through the assembly.



Red warning tags are placed at each seal-off point to prevent the breakage of seals.

Gummed paper seals for switches

Notices are served on users or occupants where and as ordinance violations are found.

Where only partial branch circuits are involved a gummed strip label of thin paper $\frac{3}{8}$ in. wide and $2\frac{3}{4}$ in. long is sometimes used. This label is so applied that a switch cannot be flipped "on" without breaking the seal. It can be pasted over the corner of a panelboard door so that the latter cannot be opened without breaking the seal. Small padlocks are also employed which may likewise be sealed in a similar manner for locking out externally operated switches, etc.

Red warning tags are placed at every point where a cut-off or seal-off has been made. These tags bear a printed warning that the breakage of seals and the use of current on condemned circuits will result in the removal of meter service from the premises, plus a fine of from $5.00 to $50.00.

Only members of the inspection department are allowed to remove seals or warning tags.

Each case which becomes recorded upon an inspectors' "no permit" notice immediately becomes an office record, since the duplicate copy is returned to the office. The inspector retains his triplicate copy for personal follow-up, since he must dispose of each case one way or another before the matter can be closed. Special men are sent out to follow his report, therefore they carry the duplicate copy of the district inspector's notice which contains the details concerning the case.

The cut-off men never go out on jobs alone but always with the inspector for the district, so as to be sure that the work in question may be quickly and completely placed out of service. Likewise two men are better able to avoid "fixes" or "frame-ups."

Savings Effected

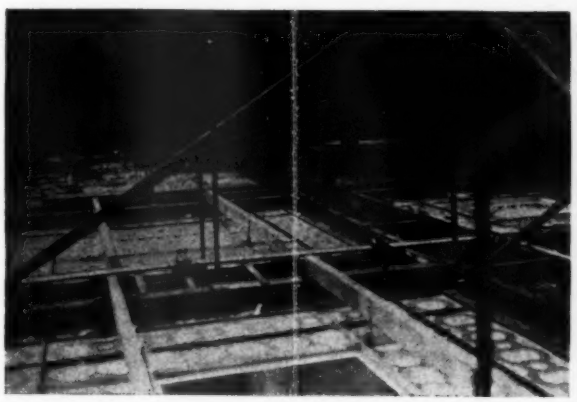
The new system replaced a method which involved a succession of individually written letters for each case. No prompt action resulted in spite of the heavy amount of detail clerical work, postage and stationery that was necessary. The many check-back trips by inspectors failed to produce results commensurate with the work that was involved. Under the present method each inspector reports a decrease in general abuses and a widespread public recognition of the electrical ordinances governing wiring installations. The legitimate contracting industry is thus also protected against the sizeable inroads from unrestricted bootleg wiring activities.

Wiring Old Public Building Skylights

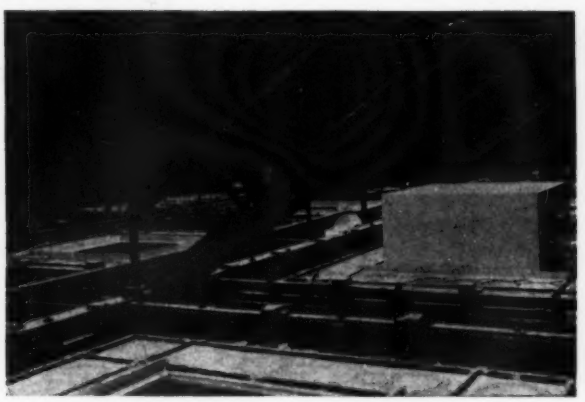
Much of this old open wiring has been disconnected as a result of the modern wiring provided above the senate chamber skylights.

In providing a modern lighting system for the senate chamber of the Ohio State Capitol at Columbus, an extensive skylight modernization job replaced obsolete equipment and wiring. Since portions of this structure date back to 1837, the architectural treatment employed in those days offered little encouragement toward present remodeling without involving a great deal of expense. Therefore a system of lighting was employed which could be readily adapted to the existing structure, but which would also give a modern and efficient effect.

The scheme of lighting involved remodeling the central portion of 32 separate leaded glass skylight frames to provide 25 in. square openings in each frame for the installation of specially designed reflector and lense housings. Wiring was provided for 18,800 watts, comprising 116 circuits which were distributed from a split bus panelboard. Two 60 amp. remote controlled master switches were installed beside the panel, together with a 100 amp. main switch, at a central point in the attic space. Two remote control switches located on the wall of the senate chamber lobby provided half or full intensity control of the lighting system, since each group of four reflectors was connected up in pairs controlled by the separate master switches.



Large skylight sections required special supporting members to safely carry the added weight of reflector housings. 4 in. channel irons were therefore installed edgewise across the section with flat iron straps bolted from channels to the new T-iron ribs. This reinforcement permitted the use of standard housings and lens spacings for the large skylights.



One of the metal housings designed for four 150-watt reflectors. The reflectors are attached inside the upper hinged cover section, which may be folded back for maintenance. The lower section supports four ribbed glass lenses. At the left and in the foreground may be seen the new T-iron supports for the old glass panes and the reflector boxes.

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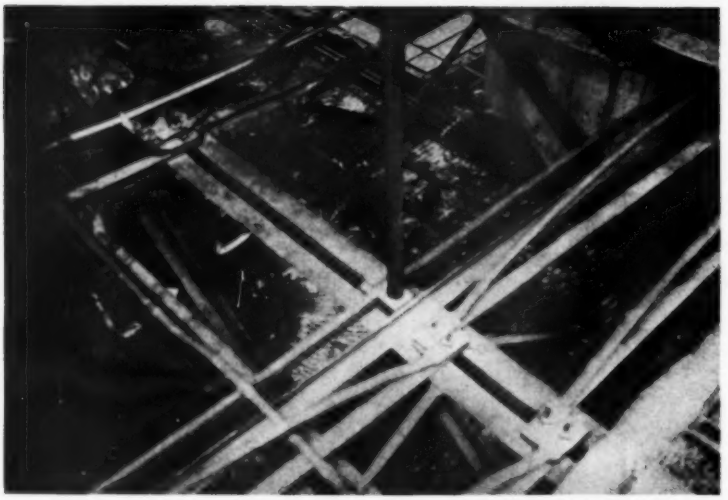

By carefully routing the ¾ in. conduits from the distribution panel (in the right foreground) a minimum amount of conduit bending was necessary despite an unusually complicated structural design.

All old open branch circuit wiring was replaced with No. 12 wire in ¾ in. conduit.

Skylight Remodeling

Each skylight section was made up of a series of cast T-shaped supporting strips which divided its rectangular area into separate rows of vari-colored leaded glass panes. New T-iron strips were installed to form a 25 in. square rabbetted mounting ledge for the enclosing box containing the reflectors and four glass lenses of each section. The space between the new T-iron supports and the nearest existing parallel support was then refitted with the old glass panes, which were cut down and leaded in by ornamental glass workers to an exact fit. Certain skylight sections which were too large to safely support the new lighting equipment were reinforced with 4-in. channel supports which rested edgewise upon the outer skylight framework. One-eighth in. by 1 in. flat iron hanger straps were bolted from these channels to the T-iron supporting ribs.

Conduit Work

The steel and cast iron structural members which were employed in this old structure did not offer a uniform conduit mounting level. Since extreme care was required in making up the conduit runs so as to avoid the possible breakage of the special leaded glass panes, a layout was followed which would eliminate all possible assembling of bent or offset pieces of conduit. This required the use of ¼ in. by 1½ in. flat iron in straight lengths and special shaped

A pair of typical ¾ in. runs which were kept free of bends or off-sets by using special flat iron straps and brackets for supports.

stirrups or brackets to support straight conduit runs in a rigid manner. These iron supports were bolted to the structural members and were drilled for one-hole conduit straps.

Since straight conduit runs governed the layout, a 4-in. square junction box was installed near each reflector housing, from which ¾ in. flexible steel conduit was extended to a connector in the metal housing wall. Asbestos covered wire was installed in the flexible conduits, due to the anticipated lamp heat.

Reflector and Lense Housings

The reflector housings were made up from details supplied by the lighting equipment manufacturers so as to correctly accommodate their special ribbed glass lenses. The upper section of each housing supported four 150-watt reflectors and was hinged to permit its being opened

Remote control switches are provided on the senate chamber floor below for the two 60-amp. automatic switches at the right, each of which controls 8 branch circuits in the panelboard at the left. A 100-amp. main disconnect switch controls the skylight wiring system, this being connected to existing open lead sheathed feeder cables directly above.

and folded back for lamp replacement, reflector and lens cleaning and other maintenance, without resorting to the use of a ladder from the floor 30 ft. below. The asbestos wiring was looped within to provide sufficient flexing slack and facilitate swinging the housing cover.

This installation is being completed by the Brooke Electric Company of Columbus, Ohio, and represents a $4,000 modernization job. Similar conditions exist in other old public buildings which offer a field for contractor selling efforts.

Motor repair work involves masses of detail which must be simplified to bring efficiency necessary to meet growing competition

Simplification of Stock Room Detail Brings Repair Shop Economies

LARGE volumes of diversified motor repair work involve a correspondingly large amount of stockroom and office detail. By simplifying such details the Boustead Electric & Manufacturing Co. of Minneapolis, Minn., has been able to bring about a reduction in general overhead and to increase production efficiency. A study of this phase of motor repair industry management is warranted at this time in order that other independent shop organizations may hold their own in the face of several competitive factors that are steadily encroaching upon this field of activity.

Four classes of competition must be reckoned with today in the electrical repair business, namely:

1. Manufacturers' service shops, dealing principally in reconditioning the larger motor equipment of their own make. Operations can to a degree be standardized in such service shops to factory mass production methods, with advantages in parts exchanges from stock for quick service and the later overhauling of old equipment as fill-in work.

2. Fractional horsepower motor "chain" service shops which have more recently been established at key cities for repairing motors for refrigerators, air-conditioning units, etc. Special shop equipment for such work, standardized production methods, perhaps piecework labor costs, and simplified methods of handling office routine have made these service organizations keen competitors of the independent shop.

3. The small repair or fix-it shop owner with little appreciation for overhead, largely doing his own work. While seldom equipped to do large motor repair jobs, the smaller jobs are done at prices which could not be reconciled by an established shop.

4. The large industrial organization which maintains a motor repair organization to handle everything except their most complicated repair problems.

Simplifying Routine

In reviewing some of the methods which are being employed by the "chain" service shops it became quite evident that individual job cost ac-

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counting and material handling would need to be greatly simplified by the independent operator. Some of the material items, for instance, which are used for the widely diversified types or classes of work done by the independent repair shop often represent such petty values per job as to render their accurate itemized control more costly than their actual worth.

A study of stock materials was made by the Boustead Company and all petty items were placed under the new general classification of "Budget Materials." As a result of this separation, the company's stockroom and office procedure was changed to consider materials in four classes as follows:

1. Budget materials (small items for which it is not economical to make detailed job record postings, requisition entries, or stock record card deductions). Some of these items are varnish, glue, string, twine, tape, solder, etc.

2. Stock materials (other stock items which are of sufficient value, or which are used in such quantities as to justify their being supplied from stockroom requisitions, to be itemized on job record cost sheets, and to be separately deducted from stock record cards). Such items would include magnet wire, fibre, copper, carbon, mica, etc.

3. Stock repair parts for motors, starters, etc., such as bearings, brushes, commutators, etc.

4. Special materials (items purchased for specific jobs, and for which no stock record or perpetual inventory card needs to be maintained).

Items Apportioned to Job

Under the Boustead company's system, budget materials are issued by the stockroom to the shop in standard packages, and are likewise charged in such lots from the inventory cards to "shop budget material" ledger account. The shop foreman estimates for each job, from the nature of the work done, the approximate total cost of budget material used and enters upon the shop order an amount to cover the budget material cost, after all major items are requisitioned.

It was found that some jobs may bear a budget material cost entry of 75 cents, which, if detailed, would reveal the use of five or six miscellaneous items, each in small quantity. Again an entry of 10 cents may appear on another job covering two or more such items. Experience has proven that the estimates are seldom excessive, yet the annual inventory test is claimed to show that this method is safe and surprisingly accurate.

Important Economies

The first impression of such a system would be in the direction of reduced clerical operations, but a review of the improved efficiency in other phases of shop practice shows certain other very important advantages:

1. Production increased by:

(a) Centralized budget material in bins available at all times to mechanic without stockroom requisition delays.

(b) Greater care in ordering all other important materials at one trip to stockroom, by being relieved of remembering the petty material items needed.

(c) Work benches not cluttered with materials obtained from stockroom before they are required.

(d) No time lost in handling special quantities—original spool or containers used.

2. Better control of valuable materials:

(a) Stock clerks may concentrate upon requisitions for major items on account of being relieved of the psychological effect of frequent entries involving petty items. This often leads to oversight on costlier materials.

(b) Foreman can check back on jobs and discover omitted items or undercharges more easily with the petty material details reduced.

(c) Reduced waste and spoilage of more expensive material by keeping petty items centralized for free access, and away from individual job materials.

3. Non-productive labor savings:

(a) Reduced detail work for stockroom by savings in (1) writing up requisitions, (2) getting out the material, and (3) returning unused portions to stock.

(b) Reduced clerical operations, (1) only standard quantities of petty materials are posted to perpetual inventory records, (2) no detailed posting, costing or extending on job records, and (3) reduction in filing material requisitions to job envelopes.

4. Economy in printing, supplies and filing capacity.

When, for an example, the shop foreman orders a can of varnish, or a spool of twine, from the stockroom, a requisition is issued which is routed through the office. This is posted to the perpetual inventory record, then costed and posted as a charge upon a "budget material" ledger account for the fiscal year. Each job or shop order, as previously explained, bears a lump sum charge for "budget material," which is determined by the shop foreman. These lump sum amounts may be posted during the year from completed job sheets to a "budget material" ledger account. At inventory time, the total cost of stockroom budget materials issued, less the cost of budget materials in the possession of the shop (not the stockroom) should balance reasonably well with the foreman's estimated charges for such material to individual jobs for that fiscal year.

ADJUSTABLE SMALL PARTS BIN

Repair parts for small motors of various makes and sizes require adequate individual bins in a readily accessible location, yet must occupy a minimum amount of space in the usual crowded repair shop. In expanding its repair parts stock to include several lines of single-phase motors, the Price Electric Co., Inc., Columbus, Ohio, employed a sectional steel bin installation. Both the horizontal and vertical dividers may be moved as desired from time to time, while each horizontal division is made to receive paper stock labels to identify the bin content. A section at the extreme left is being used for larger items, such as complete fractional horsepower motors, appliances and various large parts, until such time as it may be needed for additional small bin capacity.

No. 4—Food Products Plant

CHANGING trends in the popularity of certain food products affect plant designs and arrangements. Explosive dusts and accumulations are often present which require safe wiring methods to be installed in conformity with Article 32 of the N.E.C. Industrial contractors will find large areas improperly lighted, overcrowded distribution centers, and many motors and controls in need of replacement or repair. Hasty expansion or machinery replacement has taken place with little regard for safe wiring facilities. Plant surveys will disclose unsafe and inefficient conditions that are expensive to operate and maintain. Conditions that "just get by" must be altered if breakdowns are to be avoided.

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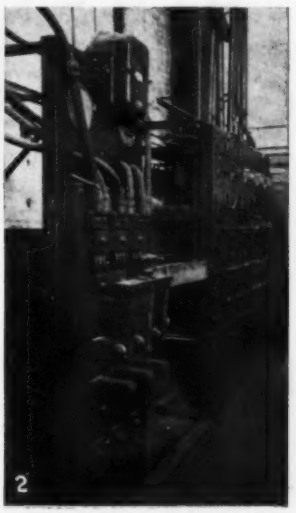
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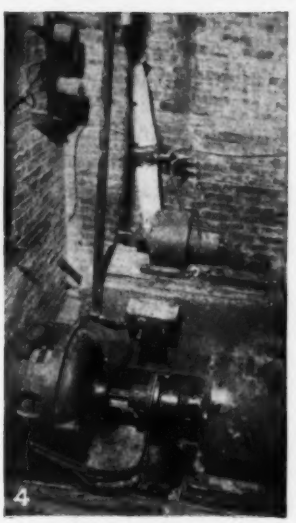
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1—After "temporary" 3-phase power service cables were installed upon the engine roof trusses, the engine room equipment was scrapped. Here two 1,000,000 C.M. cables per leg are brought overhead a distance of 100 ft. within the building to a main switch, without fuse protection between this switch and the primary fuses on the transformers mounted outdoors.

2—The "temporary" entrance switch of 2,000-amp. capacity is mounted, together with metering instruments upon a 2 in. by 4 in. wooden frame work, faced with ⅞ in. cross-boards. Note that part of the 1,000,000 C.M. cables are supported through holes bored in the ⅞ in. "switchboards." A real job for replacement and modernization.

3—These three ungrounded starters for 10 and 15 h.p. motors have undoubtedly seen better days and better mounting conditions. The wiring connections are heavily taped in a solid cluster to avoid injury. The bottom starter is held up by wire to keep it from being bumped by trucks in this crowded aisle.

4—This 5 h.p. motor and starter could be given a decent wiring connection as well as the flow integrator panel connection on the wall at upper left.

5—This plant uses 220-volt lights, and here two branch circuits are fused within a dust-laden cutout box, in the middle of a large heavily stocked warehouse.

6—One of the dust-laden machinery areas, where a battery of twelve 5 h.p. non-approved type motors are operated. This room is poorly lighted from open lamp rigid conduit goosenecks operated at 220-volts in a fog of explosive dust particles.

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electrical contracting

With which is consolidated Electrical Record

S. B. WILLIAMS, Editor

SURVEYS HELP INDUSTRY

IN our last issue there appeared some statistics of the electrical contracting industry which were compiled from questionnaire data sent to us by more than 12,000 contractors. In soliciting the cooperation of the industry in returning the questionnaires we pointed out that the data would be of material assistance in improving the contractor's economic status.

The issue had been out less than ten days when a representative of one large electrical manufacturing company started to make use of the figures. If further data which is now being gathered proves satisfactory this company will in all probability make a more intensive effort to secure larger distribution through electrical contractors.

This is pointed out at this time merely to show how important it is to cooperate in furnishing us with statistical data upon request. Our use of the data is always in the best interests of the industry. To those who helped us with material for the survey just released we express our appreciation, and for those who neglected to send in their questionnaires may we urge your cooperation in our next survey.

UTILITIES DOING WIRING

THE Code Authority has received a number of letters from members of the industry asking if the N. R. A. Code prohibited the electric light and power companies from doing electrical wiring outside their own system. The answer of course is that no one is prohibited from engaging in wiring provided he operates in accordance with the Code.

In the case of light and power companies there is an exemption on all work done by a company's own men on its own system ahead of the meter and on customers' premises for emergency work. However, when the power company goes beyond the meter for other than emergency work it must, so far as such work is concerned, abide by the rules of the Electrical Contractors Code.

In the building of farm lines, or the installation of outdoor meters the company is obviously working on its own system. Where it goes out to install manholes for an industrial plant or put up a customer's substation it is engaging in the electrical contracting business.

In either case the utility is doing the kind of work that can be done equally as well and, in all possibility, more economically by the electrical contractor. Why doesn't he get the work then? The answer is that he hasn't sold himself to the utility.

It is impossible to keep the utility out of such work by means of the Code. It is possible to keep it out by means of salesmanship. The contractors in Scranton have accomplished much in this direction.

A PROGRAM NEEDED

THE executive committee of the National Electrical Contractors Association will have its first meeting in over a year this month in Chicago. It is as big an opportunity for the committee as they had a year ago when they had the task of creating the administrative organization of the then anticipated contractor's code.

Today with the Code functioning there is the problem first, of hastening the return of business and second, of protecting the contractors' interests where they are being jeopardized by others.

A program covering these two problems is necessary and we trust that the Executive Committee of the association will at this coming meeting develop such an extensive, yet intensive program, as will enlist the enthusiastic support of thousands of contractors.

There is new business for the contractor that can be uncovered by group efforts and directed selling. There are situations either existing, or in the making, which are not to the best interests of the contractors. Some of these situations will mean the ultimate removal of the contractor from certain kinds of work unless he finds an acceptable substitute way of doing the same work.

In the protection of the contractors' interests it may sometimes be necessary to fight, but generally speaking, these present problems cannot be solved in battle. They need study and patient thought.

Generally in the past the Executive Committee has found its major problem to lie in the condition of the association's treasury. There is no financial problem this year.

The times are a challenge to the N. E. C. A., and the Executive Committee directing its policies.

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AN EXPERIMENT IN ADEQUACY

AN interesting experiment in state-wide promotion of adequate wiring was started last month in North Carolina through the State Chapter of the International Association of Electrical Inspectors, with the cooperation of the uniform ordinance department of N. E. M. A.

This is the first serious attempt to put into use the standards of adequacy adopted by the entire electrical industry more than two years ago. For that reason, if for no other, this North Carolina activity should be closely followed.

It is curious, however, to note that the lead in a program which has the greatest commercial appeal should be sponsored and promoted by the only non-commercial group in our industry—the inspectors. Since there is so little respect and trust of one branch of the industry for another perhaps the way to progress is through the one group that has no selfish axe to grind.

FAIR COMPETITION

"THE code, as I understand it, attempts to establish rules of fair competition, and to set up machinery for their enforcement. The important feature to be grasped in the hoped for successful operation of the code, is the prime need of observing the rules under all circumstances. It must become more important to follow the rules than anything else, more important than the securing of any given contract or piece of work. The rules and not the benefits must command our first attention. If and when the rules are observed meticulously the benefits will follow, and there will be benefits for all.

"The code must not be made to serve as a cloak to cover up insidious practices, nor to elevate prices to exorbitant limits. The code must not be made to assist in securing special privileges or benefits for a strong minority, nor as an instrument for punitive or vindictive action, nor yet as crutches to support the lazy and inefficient. The code must be a set of fair rules for everyone, that and nothing more."

The above paragraphs are from a letter recently written by an electrical contractor who has taken a very active part in the administration of the Code in one of the large population areas. His thoughts must be given consideration by everyone interested in seeing the Electrical Contractors' Code succeed.

While the Code is by no means a perfect document, many of the difficulties that have arisen in its administration have done so because individuals would not play the rules. In the first place it is a "Code of Fair Competition." It was not written to give anyone an advantage over another.

Instances have arisen where local administrators appeared to think that by virtue of their position they should be favored. Bids of competitors have been rejected on the flimsiest of excuses.

In other cases local associations, by no means completely representative of the local industry, have used the bid depositories in a manner unfair to non-members. Out of town bidders have in certain instances been unfairly treated.

There are cases of record where unreasonable punishment has been meted out for very minor infractions of the rules and in some of these cases it was questionable whether or not any rules had been broken.

It is to be expected, we suppose, where an administrative force of some two thousand untrained men are quickly drafted for such work, that some will be unsuited to the task. They must be replaced. The local code administrators in the whole are a fine body of men who are honestly trying to do a good job, but unfortunately, it is not their good work that gets attention. The elimination of these offenders from the ranks of administrators is a job for the Electrical Contractors Code Authority. It will not be necessary to clean up more than a few such situations to have a most beneficial effect on the rest of the country.

TICKETS FOR BAD WIRING

ADAPTING the traffic ticket, whereby the careless driver is curbed, to the curbing of bootleg wiring, the Chicago inspection department gives a ticket to all owners who are found to have bootleg wiring in their premises. Instead of trying to control the bootlegger the department is making it tough for the public that patronizes bootleggers.

The system, as described elsewhere in this issue, is working in Chicago where all former systems have failed. Briefly, the system consists of a ticket to the offending owner, ten days in which to make correction failing which the service is cut off by means of seals. The breaking of these seals or using any circuit so cut off is an offence punishable by fine.

In a survey which we conducted about a year ago the inspectors complained in many cities that they were not able to get the cooperation of the courts in convicting bootleggers. Perhaps the Chicago method of holding the owner responsible on the theory that he is maintaining a dangerous condition that was installed illegally, might be the better approach. Our experience with prohibition shows that there is only one way to discourage bootleggers and that is to have customers stop buying.

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A MONTHLY DISCUSSION OF WIRING PRACTICE AND QUESTIONS OF INTERPRETATION, PRESENTED WITH A VIEW TOWARD ENCOURAGING A BETTER UNDERSTANDING OF THE NATIONAL ELECTRICAL CODE

CONDUCTED BY F. N. M. SQUIRES
CHIEF INSPECTOR, N. Y. BOARD OF FIRE UNDERWRITERS

ARMOR OF CABLE FOR GROUNDING RANGES

Is it permissible to use the sheath of armored cable as the grounding conductor for grounding the frame of an electric range?

Yes, this is clearly permitted by 908-i-1, which says that "fixed equipment may be grounded . . . by means of the metal enclosure of the conductors feeding the equipment when such metal enclosure is connected to the exposed parts of the equipment by approved fittings."

If the range is considered portable then 908-j-1 gives the same permission.

BARE NEUTRAL

I have been told that Section 404-e permits using a non-insulated neutral as a grounding conductor for the frame of an electric range. After looking through the Code Book I find no paragraph that I consider contains this meaning. Am I correct?

Section 404-e says that when certain conditions are met a bare neutral service conductor may be used, but does not in anyway, neither expressed nor implied, give any permission for the use of a bare conductor for interior wiring beyond the service.

Also, nowhere in the Code is there a rule making permissible the use of a bare wire on interior wiring circuits; nor is there any rule permitting the grounding of the frame of a range to the neutral circuit conductor, although in some localities advantage has been taken of the wording of rule 908-i-4 whereby "by permission of the authority enforcing this Code other means for grounding fixed equipment may be used." That is, if the inspection department having jurisdiction will approve it the neutral may be used as a grounding means.

BALANCE COIL

Why does the Code prohibit the use of a balance coil on a grounded system?

The Code does not prohibit the use of a balance coil, or, as is genally called, auto-transformer, on a grounded system for rule 2001-b-l permits the use of the auto-transformer, *but only* where the system supplied contains an identified grounded wire which is solidly connected to a similar identified grounded wire of the system supplying the auto-transformer.

This, of course, does not permit deriving a 110-volt or a 110-220-volt circuit from a 220-volt supply.

The use of auto-transformers otherwise than as permitted in 2001-b is prohibited because of the fire hazards involved.

MOTOR DISCONNECT SWITCH

On page 109, Article 8 of the Code a diagram for motor wiring is shown. In motor starting switches where a thermal relay is used and the switch held in by a magnet do you consider that a separate disconnecting switch is to be installed?

If the device mentioned above is manually operable—that is, capable of being opened by hand regardless of the magnet—then under rule 1005-a-3 a separate disconnecting switch is not required provided this controller opens all ungrounded wires to the motor and there is in addition to the controller an automatic overcurrent protective device ahead of this controller.

RANGE CONNECTOR

Rule 1602-a states that either a switch or approved attachment plug and connector receptacle shall be used as a control means for an electric range, this device to be readily accessible to the operator of the appliance.

During the last few months an approved single attachment plug and connector receptacle appeared on the market that employs the use of bolts to properly connect the opposing ground straps. Can this bolted type of unit or connection be disconnected in suitable time to be classified as usable in lieu of a switch, a tool being necessary to disconnect it at any time?

If the plug part of the device may be readily removed from the receptacle without the delay of having to remove a bolt connecting two grounding clamps, this connector would serve as a switch.

If, however, the plug cannot be disconnected without unfastening the bolt the connector would not be suitable to serve as a disconnecting switch. A flexible lead between the grounding straps would probably solve the difficulty.

SIZE OF GROUNDING CONDUCTOR

I would appreciate an opinion on computing the grounding conductor size, also conduit size for the grounding conductor applying Section 903-c, 908-b, k and l of the 1933 Code on the following set-ups:

A 3-phase, 4-wire installation. The

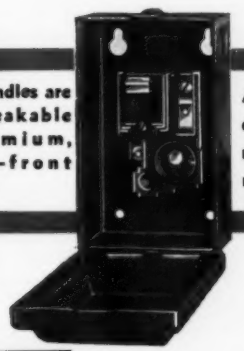
Introducing

A NEW DEAL in Switch VALUE
A NEW IDEAL in Switch DESIGN

THE NID LINE

FEATURING

A *NEW IDEA* SNAP-ACTION MECHANISM, WITH TOGGLE-LOCK PRESSURE CONTACTS

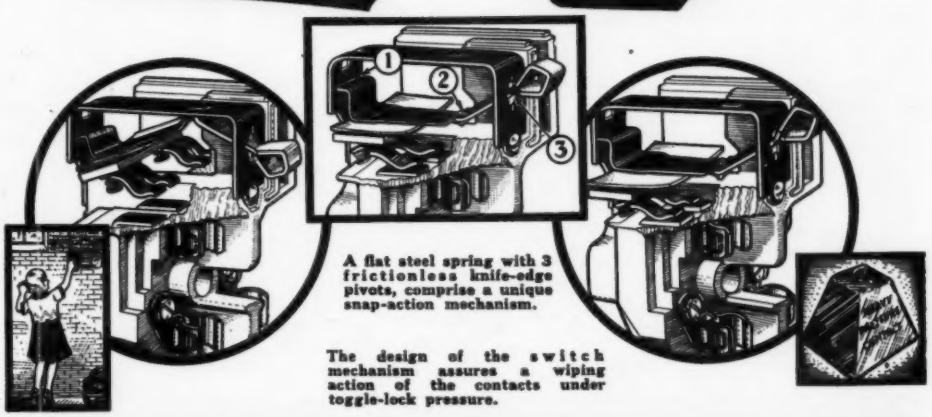


Toggle Handles are of unbreakable Steel, cadmium, finish—front operated.

Available in two different size cabinets, of distinctive modern design.

The IDEAL SWITCH To Use For:

Electric Refrigerators
Oil Burners
Air Conditioners
Service Entrance
Stores & Factories



The Toggle Handle secures quick and easy operation. Note the "toe & heel" type movable contacts.

A flat steel spring with 3 frictionless knife-edge pivots, comprise a unique snap-action mechanism.

The design of the switch mechanism assures a wiping action of the contacts under toggle-lock pressure.

BULLDOG ELECTRIC PRODUCTS CO.

DETROIT MICH. U.S.A.

NRA

These *New* COLT-NOARK
Industrial Safety Switches

. . . . . have been designed for INCREASED EFFICIENCY . . . . . GREATER SAFETY CLOSER BANKING . . . . and MORE ECONOMICAL INSTALLATION . . . . . .

In two important lines of Colt-Noark Industrial Safety Switches — new and important improvements appear to place them a step ahead of the field. Stronger boxes make for longer life. New cover design adds strength and makes possible narrower and more compact boxes. Improved door catch does away with barked knuckles, and adds to strength and safety. And last, but not least, the new pistol grip operating handle makes closer banking possible and adds to efficiency. These latest improvements have been made to save your time, reduce your installation cost, and furnish you with Colt-Noark Switches that are second to none in engineering design and operating efficiency.

NEW TYPE "C"
The improved Type "C" Line utilizes the famous Nu-Blade breaking principle in the 250 volt line. Then for 575 volts (shown open) the new Dual-Break principle is used. Dual-Break means greater safety — minimum replacement costs — ample room for wiring. All new Type "C" switches now have H.P. rating.

NEW TYPE "A"
Outstanding efficiency is found in the new Type "A" Noark Switches — due to the new Dual-Break principle used in the 250 volt boxes. Unit block construction permits quick and economical replacement. Then for the 575 volt line (shown closed) the new Type "A" switches use the Quad-Break principle — the most efficient and safest yet devised.

• • •

Colt Noark Branches at: Boston, New York, Chicago and Philadelphia. H. B. Squires Co., Pacific Coast Representative.

Manufactured by
COLT'S PATENT FIRE ARMS MFG. CO.
Electrical Division
HARTFORD, CONNECTICUT

THE RAMPANT COLT
Are you on the RAMPANT COLT mailing list? If not, send your name and address for regular copies. Convenient size.

COLT-NOARK
SWITCHES - MOTOR STARTERS - FUSES

service conduit is 3-in.; the single-phase lighting service is a No. 8 3-wire having a 30-amp., 3-wire entrance switch. This installation is to be changed to a 4-wire, 3-phase of the new meter sequence type.

What size grounding conductor should be run for common ground from the neutral conductor to a water main grounding source if grounding conductor is run open?

Also, what size conduit and grounding conductor if said conductor is installed in said conduit and run to water pipe ground source?

A No. 8 service when protected by 30-amp. fuses requires the use of a No. 14 wire, or ½-in. conduit as a grounding conductor for the neutral.

A 3-in. service conduit requires a No. 0 or a 1-in. pipe to be used as a grounding conductor.

If it is desired to enclose the No. 0 wire in conduit, rule 503-q requires the use of 1-in. conduit. However, as a No. 0 grounding conductor is larger than No. 4, it does not have to be protected. On the other hand, as a 1-in. pipe would satisfy the conditions for grounding the 3-in. service conduit, we would not need to use a grounding wire (No. 0 or otherwise) in this 1-in. pipe. Therefore, in the set-up mentioned, the 1-in. pipe would satisfy all of the conditions.

Aids in Curbing Bootleggers: M. C. Brooke, proprietor of the Brooke Electric Co., Columbus, Ohio, has served Columbus as chairman of the city license board for electrical contractors since that body was created by ordinance in January, 1934. Under the present procedure the chairman appears before the courts in all citations made by the inspection department for Code violations or for work done by non-licensed persons. Mr. Brooke reports satisfactory progress in curbing unauthorized wiring and the gradual elimination of the use of unapproved materials, particularly for gas tube signs.

BULL DOG

FRICTION TAPE

IT STICKS
IT HOLDS
IT LASTS

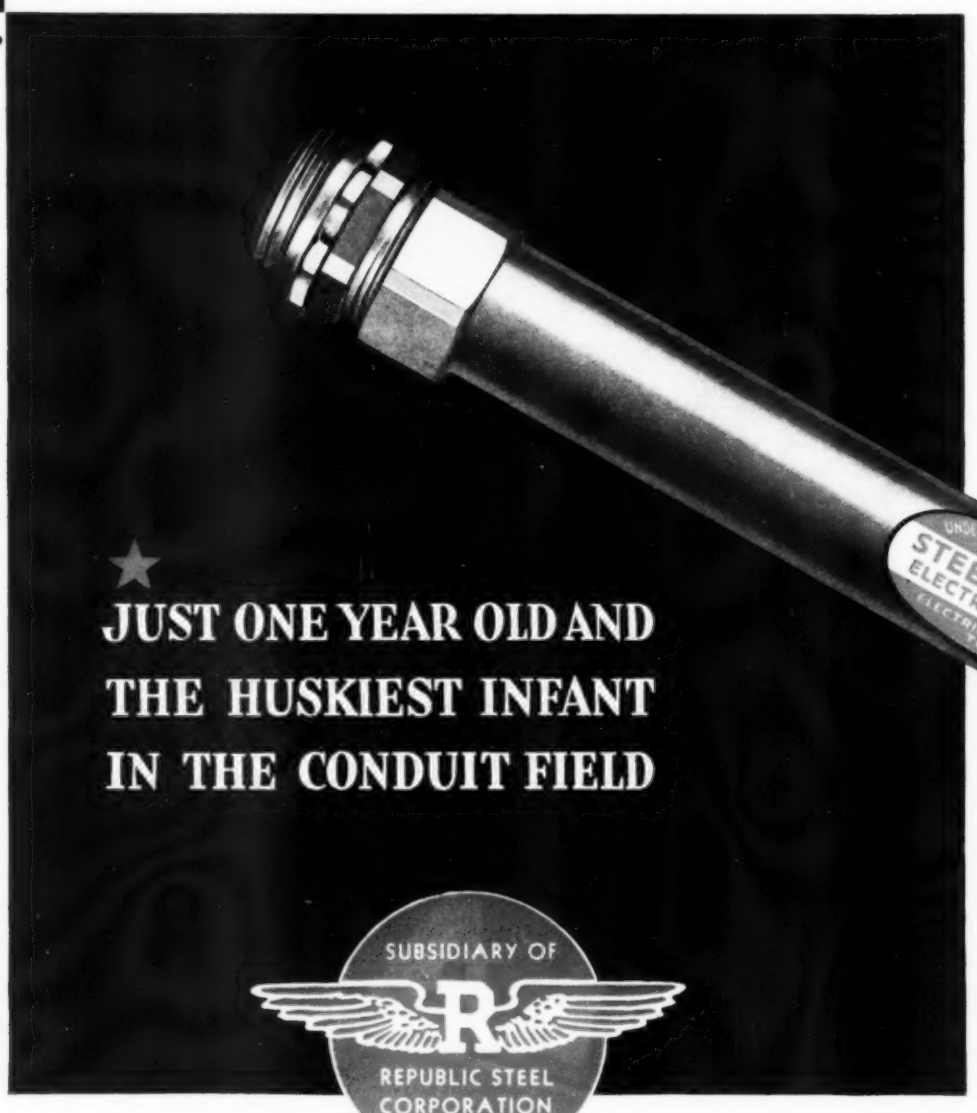
BOSTON WOVEN HOSE AND RUBBER CO.
CAMBRIDGE, MASS.

ELECTRICALLY

• WELDED •

REG. U. S. PATENT OFFICE

electrunite



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JUST ONE YEAR OLD AND
THE HUSKIEST INFANT
IN THE CONDUIT FIELD

SUBSIDIARY OF
REPUBLIC STEEL
CORPORATION

Steel and T

WORLD'S LARGEST PRODUCER OF EL

CLEVELAND

Steeltubes

Just about a year ago Steel and Tubes, Inc., introduced an improved Electrunite Steeltubes—an electric metallic tubing with a new inside surface designed to make cable slide through it more easily.

Today, this conduit has been given universal acceptance, because it has proved its real worth. Millions of feet have been sold. Demand, many times during the year, has taxed production, and is still increasing.

This fast-growing infant in the conduit field gives the building owner a big dollar's worth—full mechanical and electrical protection for wiring. Architects find it helpful where space limitation is a factor. Contractors like it, because it helps finish jobs on schedule—profitably. And electricians find that it saves physical effort, because it requires no threading and cuts down by approximately 35% the pull required on long runs of cable.

Knurled inside finish in ½", ¾" and 1" sizes

Genuine Electrunite Steeltubes is sold by reputable electrical wholesalers everywhere. Investigate if you have not yet tried it. Other contractors have found that, with all necessary couplings and connectors, it costs less to buy than ordinary threaded conduit. Let it help you make a profit on every job.

d Tubes *Inc.*

CER & ELECTRICALLY WELDED TUBING

ND . . . OHIO

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CODE AUTHORITY NEWS

Material for this Department is furnished by The Electrical Contractors' Code Authority headquarters staff

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L. W. Davis, Executive Officer, 420 Lexington Ave., New York, N. Y.
E. N. Peak, Vice-Chairman, Marshalltown, Iowa
J. G. Livingston, New York, N. Y.
W. A. Ritt, Minneapolis, Minn.
A. J. Hixon, Boston, Mass.
W. W. Ingalls, Miami, Fla.
R. W. Hodge, Kansas City, Mo.
D. B. Clayton, Birmingham, Ala.
Lloyd Flatland, San Francisco, Cal.
R. L. Jacobe, Houston, Texas

THE NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION SPONSORS THE CODE OF FAIR COMPETITION FOR THE ELECTRICAL CONTRACTING INDUSTRY

BANCROFT T. FOLEY APPOINTED CHAIRMAN REGION 3

Bancroft T. Foley of Howard P. Foley Company, Washington, D. C., has been appointed chairman of Region No. 3 to succeed F. M. Shepard of Philadelphia, who resigned the first part of the year.

Region No. 3 includes southern New Jersey; Pennsylvania, except the western part; Maryland, District of Columbia and Delaware.

OIL BURNER AND COTTON TEXTILE CONFLICT UNDER DISCUSSION

Negotiations are now under way between the Electrical Contractors Code Authority and the code authorities for the oil burner industry and for the cotton textile industry for clarification of the scope of these industries and the jurisdiction of the Electrical Contracting Code over electrical construction and installation work done in connection with these businesses.

DECISION STILL PENDING ON OVERHEAD

Owing to the hearings that took place in Washington during January covering the broad question of price fixing and selling below cost, the application of the Electrical Contractors Code Authority for the inclusion of a minimum overhead in the Code as a part of cost and other provisions governing cost finding, has been held up. In all likelihood, no decision will be reached on this matter until the administration has come to some definite conclusion on the entire subject of prices and selling below cost.

WIRING FOR ELECTRIC SIGNS UNDER CONTRACTORS

A ruling has been made by George S. Brady, assistant administrative officer, N. R. A., to the effect that the provision of the Electric and Neon Sign Industry Code covering installation includes nothing more than the ordinary installation of the products.

In other words, the sign code covers the erection and installation of electric and neon signs but does not include any wiring other than connection with the wiring brought to the point of the sign. Wiring up to that point comes under the Electrical Contracting Code.

PRESENT BLUE EAGLES TO BE USED IN 1935

The National Recovery Board has announced that the Code Blue Eagles, including those for the construction industry, marked "1934" are applicable in 1935.

HOOLEY TEMPORARY CHAIRMAN REGION NO. 2

John W. Hooley of New York has been appointed interim chairman of Region No. 2 during the two-month period of January 19 to March 12 in the absence of the regular chairman, J. G. Livingston, who is on a trip to South America.

EXEMPTION OF ASSESSMENT IN MORE THAN ONE DIVISION TO END

The famous administrative order X36 exempting members of one industry, in which they did their principal business, from the payment of code assessments for operations in other industries has been terminated in so far as it applies between the members of those divisions of the construction industry which, through their respective code authorities, have entered into such an agreement. Any member of such divisions where agreements have been entered into shall be subject to the established assessments that cover the work he is doing if he enters the field of such other divisions.

RECOMMENDS LOWER WAGES FOR SOUTHERN COMMON LABOR

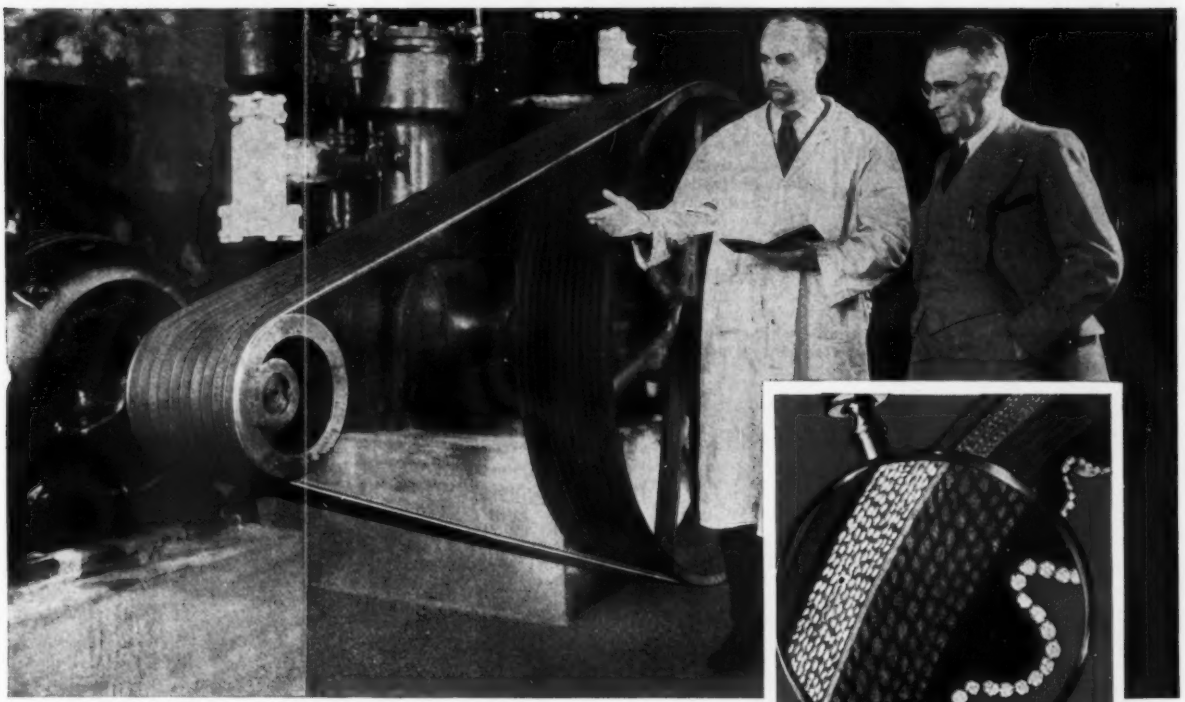
At a meeting of the Construction Code Authority held in Washington on January 25 it was voted to submit to N. R. A. a recommendation that the minimum wage for common labor in the southern states be reduced from the 40 cents per hour now set up in Article 3 of Chapter I to 30 cents per hour.

This recommendation will require approval by N. R. A. before it becomes effective and may involve a public hearing.

HIGHER ASSESSMENTS FOR LOCAL EXPENSES WAITS ON L. A. C. BUDGETS

The application of the Code Authority to N. R. A. for an increase in the assessment for local expenses from 1/10 of 1 per cent of all contracts of $250 and over to ¼ of 1 per cent of all electrical work or services without limitation has received favorable consideration in Washington. However, before the legal department of N. R. A. will approve this application it will be necessary for all local administrative committees to submit budgets showing their

Turning POWER WASTES into NET PROFITS!



● *Here's the V-Belt that gives greater gripping Power with less Tension. Only Dayton V-Belts have* straight *die-cut sides that* exactly fit *the pulley grooves at all times regardless of speed or load.*

● Today, as never before, executives are analyzing and studying power transmission problems because of the savings that can be effected through the elimination of power wastes. Nowhere else can management find an equal opportunity to reduce expenses and increase net profits.

During the past seven years in thousands of industrial plants troublesome power transmission problems have been solved and real savings effected through the installation of Dayton V-Belt Drives. A production manager in a large meat packing plant said, "Our savings will total thousands of dollars a year. The short center-to-center couplings of Dayton V-Belt Drives permitted two motor-driven compressors to replace one steam compressor *in the same floor space.* Temperatures were reduced from 12° above zero to 3° above, and operating time reduced from 7 days to 5½ days per week. For the first time in 50 years no steam is required in the plant on non-operating days."

Similar savings have been made in plants of all kinds where Dayton V-Belts have been installed. Here are some of the reasons why—Dayton V-Belts are "built-to-bend." Their exclusive and patented construction makes them more flexible. They are die-cut, not molded, and accurately fit the grooves of all standard pulleys. Their rigid crosswise construction prevents distortion—there is no slipping or weaving. This means smoother running . . . positive speed . . . less tension . . . less wear on bearings. Machines last longer and there's practically no maintenance cost.

But there's much more to tell. Let us give you all the facts about the many exclusive advantages of Dayton V-Belt Drives. Wire or write today.

THE DAYTON RUBBER MFG. CO.
Dayton, Ohio
The World's Largest Manufacturers of V-Belts

Dayton
COG-BELT DRIVES

Cog-Belt Drives—F.H.P. V-Belt Drives—V-Flat Drives—Complete Drives, Pulleys and Belts in Stock. Fractional to 100 H.P.

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GREENLEE Conduit BENDERS ARE MONEY SAVERS

Bending rigid conduit with a Greenlee. These Benders are convenient to operate and require very little effort, even for bending the larger sizes.

The statement that Greenlee Hydraulic Conduit Benders are money savers is not mere sales talk. We make it with confidence, because so many users have gone to the trouble to say so in letters to us.

These users tell of many cases where a Greenlee Bender has more than paid for itself on the first job. And any tool that pays for itself on the first job is surely going to save just as much money on every other job.

There are many reasons why this is true of Greenlee Benders, but they can all be summed up in the statement that they bend conduit faster and better than by any other method; that they eliminate the need for many costly fittings; and that they make it easier to pull in wire and cable.

We want you to know more about the improved benders shown here and how they will save money for you. Just use the handy coupon provided below. No obligation, of course.

Greenlee Rigid Conduit Bender. Built in two sizes for bending from 1¼" to 3" conduit and from 2½" to 4½" conduit.

Greenlee Conduit Bender with attachments for bending thin-wall steel conduit in sizes from 1¼" to 2".

Greenlee TOOL CO. GREENLEE ALL STEEL

ROCKFORD, ILLINOIS, U.S.A.

.....Mail This Coupon To-day.....

GREENLEE TOOL CO., ROCKFORD, ILL. Date.....

Please send information on your improved Conduit Benders.

Name.....Address.....

City.....State.....

My Jobber is..... 2-35

needs and, furthermore, to show that their needs can be met by such an assessment. Letters and forms covering this have been sent to all L. A. C.'s and as soon as returns are received it is expected that a prompt decision will be made.

COMPETITIVE BIDDING LOOPHOLES BEING STUDIED

A special committee of the Construction Code Authority is now at work drafting proposed amendments to Chapter I of the Construction Code, seeking to define more clearly "competitive bidding" in order to plug up the loop-holes that have developed from experience, such as the giving of jobs on a time and material basis after competitive bidding has been taken, the calling for new bids after bids have been exposed by a successful general contractor who has previously invited no bids or has taken only one bid and thereby not coming within the definition of competitive bidding as now defined under Section 1, Article VII of Chapter I, and many similar combinations of bidding which are not properly safeguarded in the codes as now written. It is thought probable that as these proposed amendments are developed similar changes may be needed in the Electrical Contractors Code to tie in with such amendments.

Specializing in Power Factor Correction: Over 25 years' experience in heavy industrial contracting work has resulted in Thomas G. Hodgdon of the Franklin Electric and Construction Co., Pittsburgh, Pa., becoming a specialist in power factor correction problems. Thomas, Jr., after attending Purdue University, has become active in the firm, thus making it possible for Mr. Hodgdon to devote considerable time to the duties of district chairman for the Code Authority. In addition to father and son, an assistant engineer is employed for making detailed power problem surveys in industrial plants.

Youngstown
YOUNGSTOWN
In Youngstown's laboratories scientists are constantly probing deeper into the uncharted areas of steel metallurgy. From their tireless experiments emerge new alloys, more accurate processes, anticipating the demand of tomorrow's industries.
THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO
BUCKEYE CONDUIT

CONTRACTING news

INFORMATION OF INTEREST TO ELECTRICAL CONTRACTORS CONSISTING OF ITEMS OF NEWS, SHORT ARTICLES, PRACTICAL IDEAS, ETC., OUR READERS ARE INVITED TO CONTRIBUTE TO THIS DEPARTMENT

BIENNIAL CODE REVISION MEETING CALLED FOR MARCH

The regular biennial meeting of the Electrical Committee of N. F. P. A. will be held in New York, on March 19 to 22, for the purpose of revising the National Electrical Code.

NORTH CAROLINA INSPECTORS TO PROMOTE ADEQUACY

A plan for the state wide promotion of adequate wiring under the auspices of the North Carolina chapter of inspectors was announced at a meeting of the chapter in Charlotte on January 16 and 17.

A manual of adequacy was prepared for this first movement to promote adequacy on a state-wide basis through the cooperation of the uniform legislation department of N. E. M. A.

SAN FRANCISCO CONTRACTORS CHANGE OFFICERS IN RECORD VOTE

A record turn-out of the members of the San Francisco Electrical Contractors Association on December 28th elected a new set of officers as follows:

Joseph Carlson, Central Electric Company, was named president; George Draeger, Draeger Electric Company, vice-president and Edward Martin, veteran of the position, was returned to the secretaryship after a year's relief. C. B. Kenney, Ne-Page-McKenney Company, was re-elected treasurer. The board of directors, in addition to the officers, includes Charles A. Langlais; H. C. Reid; L. J. Douat; Ed Conroy; Sam Radelfinger; Victor Lemoge, and Lloyd Flatland, the chairman of the Twelfth Region Code Committee.

The board of operation is chairmanned by Clyde L. Chamblin, former president of the national association. Frank F. Goodman is vice-chairman, and C. C. McLean, secretary. The remaining members of the board of operation include R. W. Griffin, Seth Butler, Charles H. Shipman, A. L. Biber, L. A. Delatour, James Galvin, Charles X. Schmitt, William Weindorf, Ike Fross, A. T. Lipscomb and Ed Brumfield.

THREE WAGE ZONES PROPOSED FOR EVANSVILLE AREA

At the hearing on January 8 for a wage agreement in the Evansville area under the provisions of the Electrical Contractors Code three separate zones depending upon location were proposed. The proposed wages for journeymen are zone A, $1.12½ per hour; zone B, $1.00 per hour and zone C, 85 cents per hour. It was proposed, however, that the wages for new residential work, except when done in conduit, and for any wiring in completed residences should be 90 cents per hour in zone A and 80 cents per hour in zone B.

The agreement further proposed that electricians be held responsible for employer's tools and equipment when the latter furnishes a tool box with lock or other safe storage place.

Association Leader: Electrical contractors in and about Olympia, Wash., have a live organization known as the Thurston County Electrical Contractors' Association. One of the leaders in this organization is J. N. Grim, proprietor of the G. & G. Electric Company, Olympia, who acts as secretary.

COMMERCIAL LIGHTING DRIVE TO START IN FEBRUARY

Announcement is made by the Artistic Lighting Equipment Association that it will start the first of February a commercial lighting campaign in which it expects to tie in all of the electrical industry. The campaign is staged to take advantage of F. H. A. financing.

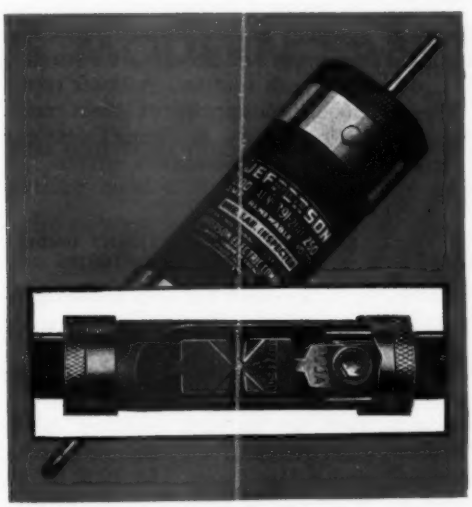
Certified lighting equipment bearing a numbered seal will be featured in the drive.

VOTE AGAINST BARE NEUTRAL IN 1935 CODE

The special committee on bare neutral interior wiring systems appointed by the Electrical Committee, N.F. P.A., has recommended that no further recognition be given to such systems in the 1935 edition of the National Electrical Code.

The committee also recommended that if bare neutral is recognized in the Code its use be restricted to the following conditions: (1) a.c. only, (2) not over 150 volts to ground, (3) to be used only where the neutral can be grounded to an underground water-pipe, (4) limit to sections 503-4-5-7-8-10-11, (5) at least two paths to ground from each outlet, (6) metal enclosing systems must be made continuous by bond-jumpers or equivalent, (7) no switch or fuse in neutral conductor which must be made continuous by bonding or equivalent at all junction boxes, (8) permit only with identified wire throughout, (9) only for fixed wiring up to final outlet, insulated beyond, (10) metal enclosure to be bonded to all foreign metal systems with which it makes contact, (11) not to be used as exten-

Help your customers reduce the slice STOPPED TIME takes



The secret of Jefferson Super-Lag performance is in the lag plate on the Super-Lag link. This plate delays the normal fuse action, provides a time interval or lag by absorbing temporary heat rise. This time-lag prevents the fuse from blowing on harmless temporary overloads—saves needless STOPPED Time and link replacements.

Your customer has to pay his men whether they are working or are waiting on a STOPPED motor. Show him how he can avoid the many needless stops by using fuses which protect TIME, not just the motors.

Jefferson Super-Lag Renewable Fuses protect TIME. They do not blow the moment current rises—do not stop the motor if the overload is only temporary. But they operate positively before the actual danger point is reached. It is this "wait" which gives the motor a chance to recover speed—which eliminates needless STOPPED TIME.

Jefferson Super-Lag Fuses are made in both knife-blade and ferrule types, in all capacities to suit every customer's need. Liven up fuse sales by selling TIME protection along with motor protection.

Fuse Chart—FREE—A handy guide to selection of proper size fuses at a glance, for the adequate protection of motors. Ask for Fuse Chart No. 18.

JEFFERSON ELECTRIC COMPANY
BELLWOOD (Suburb of Chicago) ILLINOIS
Canadian Factory: 535 College Street, Toronto

JEFFERSON
Super-Lag RENEWABLE **FUSES**

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sions of existing insulated systems, (12) prohibit the use in hazardous locations.

Provided that the above limitations are observed the committee encouraged inspection authorities to permit trial installations.

QUAD-CITIES LAUNCH OUTLET CAMPAIGN

Additional convenience outlets are being featured in a 60-day advertising campaign commenced December 15 by the members of the Quad-Cities Electrical Contractor's Association, which comprises firms in Davenport, Ia.; Rock Island, Moline and East Moline, Ill. A special selling price of $9.99 for three outlets is offered. A bonus of 50 cents per outlet for each job of three or more outlets installed is paid to the contractor by the utility as additional compensation. Customer billings for campaign outlet work are made upon the utility's light bills in conformity with special order books supplied to each contractor who is engaged in such work.

On the Monday following the initial week-end newspaper publicity, several contractors had already received orders by telephone. Each ad includes the names and telephone numbers of those contractors who are cooperating in this work with the utility. The budget and publicity for this program was worked out with the Tri-City Electric League, with a major portion of the expense being underwritten by the utility.

Manages Chapter and Construction League: P. M. Geary, manager of the Youngstown (Ohio) Electrical Contractors' Association since August, 1931, has taken such an active part in local building industry matters that he is also manager of the Construction League of that city. In assuming these additional duties in April, 1934, the principles of trade relations among seven other industry divisions, namely, general contractors, master plumbers, painters, roofers, sheet metal, structural steel, tile and marble, and plastering contractors were developed along the lines of the electrical group. It is also hoped to ultimately include the architects in this organization as the logical clearing house for all industry problems. The nineteen electrical contractor association members also constitute the Youngstown Chapter of N.E.C.A., and of this group, eleven firms which operated in the territory of the local utility, are given all range and service change wiring jobs.

NEW OFFICERS ELECTED

Kansas City (Mo.) Chapter, N. E. C. A.—Fred E. Geiss, president; J. H. Mackay, vice-president; E. L. Fickie, treasurer and W. T. McAuley, G. G. Burkholder and B. R. Nelson, directors.

Poughkeepsie (N. Y.) Electrical Contractors' Association—Joseph D. Quinn, president; Edwin R. Pease, vice-president and Edward Bahret, secretary-treasurer.

Utica (N. Y.) Electrical Contractors Association, Inc.—W. T. Langdon, president; W. H. Gangloff, vice-president; F. M. Keinz, secretary; W. H. Williams, treasurer; H. G. Hatfield, J. C. Campbell, A. Engler and J. Manning, directors.

Queensboro (N. Y.) Electrical Contractors and Dealers Association —Harry N. Jacobs, president; W. J. Ward, vice-president; Edward Weiss, secretary; George Dresser, treasurer, William Wetzel, recording secretary.

NEW FOOT-CANDLE STANDARDS

A new set of recommended foot-candle standards have been compiled by the Nela Park engineering department of the General Electric Company, and are available through their Incandescent Lamp department in a 22-page pamphlet entitled "Recommended Standards of Illumination." Four sets of data are embraced in this pamphlet, namely, Table I, stores, commercial and public interiors; Table II, industrial interiors; Table III, recreational lighting, and Table IV, outdoor lighting.

Built From Small Jobs: Small remodeling jobs, residence wiring, old and new, and filling stations have provided sufficient revenue for Carl W. Weber to build this neat store on the front of an old residence. Being a specialist in old residence work, the Weber Electric Construction Company, Kansas City, is well prepared for home modernization activities and already reports a satisfactory increase of such business. A recent contract covers a large modernized exhibition home sponsored by the Ladies' Home Journal.

OMAHA-COUNCIL BLUFFS CONTRACTORS EMPLOY MANAGER

Commencing in November the contractors of Omaha, Neb., and Council Bluffs, Ia., placed the detail affairs of local code administration and other contracting routine in the hands of J. P. Brown, a pioneer electrical man of that region. To date there has been insufficient time to appraise the accomplishments under the managership of Mr. Brown other than the important benefits of centralized code work routine. A closer contact among contractors of these neighboring cities is being developed through the manager's efforts.

SMALL ELECTED PRESIDENT UNDERWRITERS' LABORATORIES

A. R. Small has been elected president of Underwriters' Laboratories to succeed the late Dana Pierce.

Mr. Small joined the staff of Underwriters' Laboratories, Chicago, in 1906 as assistant engineer in the newly created electrical department under Mr. Pierce. In 1908 he was made special agent and in 1910 was appointed superintendent of the label service department, which he had organized. He continued in charge of the label service after election as vice-president in 1916 until his trans-

THIS MODERN SAFETY SWITCH IS YOUR OPPORTUNITY

If you had your choice wouldn't you rather ride a new streamline train, the newest low wing plane, or air flow car? It's human nature to want the latest . . . and the man who supplies a *modern* safety switch marks his job as better . . . makes an impression that gets more business.

Alert contractors will cash in on the appeal of this modern Cutler-Hammer (Bul. 4140) Safety Switch. It has every desired feature. Suitable for entrance switch requirements in many sections. Ideal for oil burners, domestic stokers, air compressors, unit heaters, dairies, laundries, ice plants, stores, etc.

This small switch offers an unusual opportunity. Carried by independent electrical wholesalers everywhere. Feature it now. Send for literature. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus,* 1306 St. Paul Avenue, Milwaukee, Wisc.

C-H

Bul. 4140H2—Type D—30 ampere—positive Make and Break. Plenty of knockouts located near back *edges* to permit direct running of conduit. Not only customary ample wiring space but mechanism completely removable to permit unobstructed pulling of wires.

CUTLER-HAMMER SWITCHES

BUILT TO THE FAMOUS STANDARD OF CUTLER-HAMMER MOTOR CONTROL

UMI

THE WIREMOLD ZONE

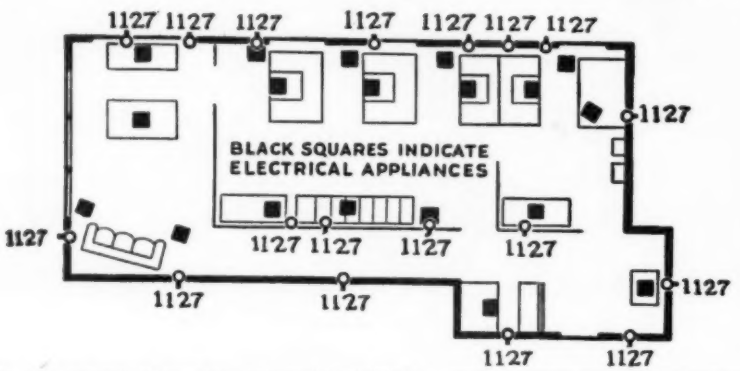
THERE IS A WIREMOLD ZONE OF USEFULNESS AND PROFIT IN EVERY FIELD OF WIRING PRACTICE!

NUMBER 5 OF A SERIES ON WIRING OPPORTUNITIES

Still more *EVIDENCE!*

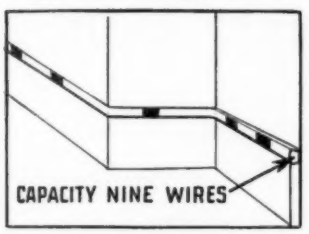
See how adequately Wiremold solves this problem of providing *REALLY PRACTICAL* and *ECONOMICAL*

CONTINUOUS *Outlets!*

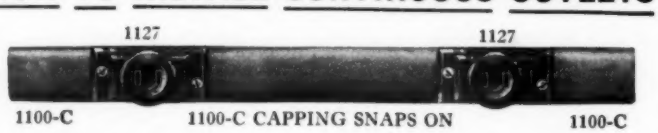


IN this typical office plan Wiremold Lighting Strip is laid on baseboard of walls and partitions, FORMING A CONTINUOUS BAND CLEAR AROUND EACH ROOM. Outlets are installed in a jiffy IF, WHEN AND WHERE NEEDED. There is no fuss or interruption of business. In the same way continuous outlet or socket connections can be provided for benches in work shops, laboratories, etc.

Just another example of Wiremold Versatility!



HOW TO INSTALL CONTINUOUS OUTLETS



Add outlets when you need them. Place them where you want them. Cut capping (1100-C) to fit spaces between.

THE WIREMOLD COMPANY, Hartford, Conn.

fer to New York eight years later as resident vice-president.

Soon after becoming established in New York City Mr. Small accepted appointment as chairman of the Electrical Committee of N. F. P. A. He will continue as chairman of this committee, at least until the work now in progress on the 1935 revision is completed.

REINSPECTION URGED AS RECOVERY MEASURE

A plan to increase industrial business, which has as one of its points the removal of accident and fire hazards through reinspection, has been submitted to President Roosevelt by the Porcelain Enamel Institute through its president, Rudolf W. Staud.

In making this suggestion Mr. Staud recommends the coordination of the inspection and enforcement activities under existing state factory inspection laws and state and municipal safety and fire ordinances.

NEW BUILDING EXITS CODE AVAILABLE

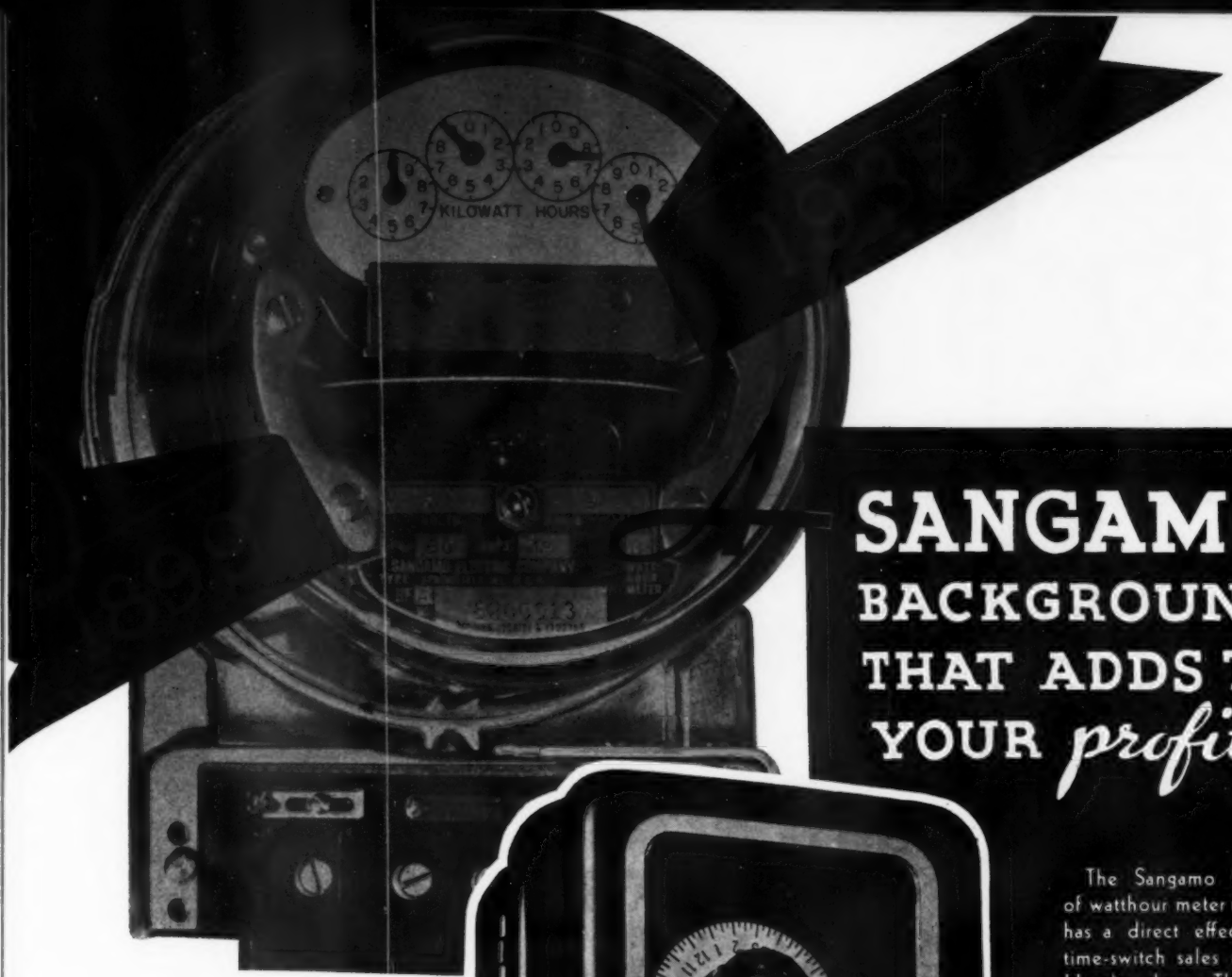
The third edition of the Building Exits Code sponsored by the N. F. P. A. is now off the press. The text includes the amendments to the 1929 edition adopted by the association at the 1934 annual meeting.

This code includes standards on stairs and stair enclosures, outside stairs (fire escapes), ramps, horizontal exits, doors, aisles and corridors, elevators and escalators, slide escapes, alarm systems, fire exit drills, and signs and lighting. General exit requirements are given with chapters specifying detailed application.

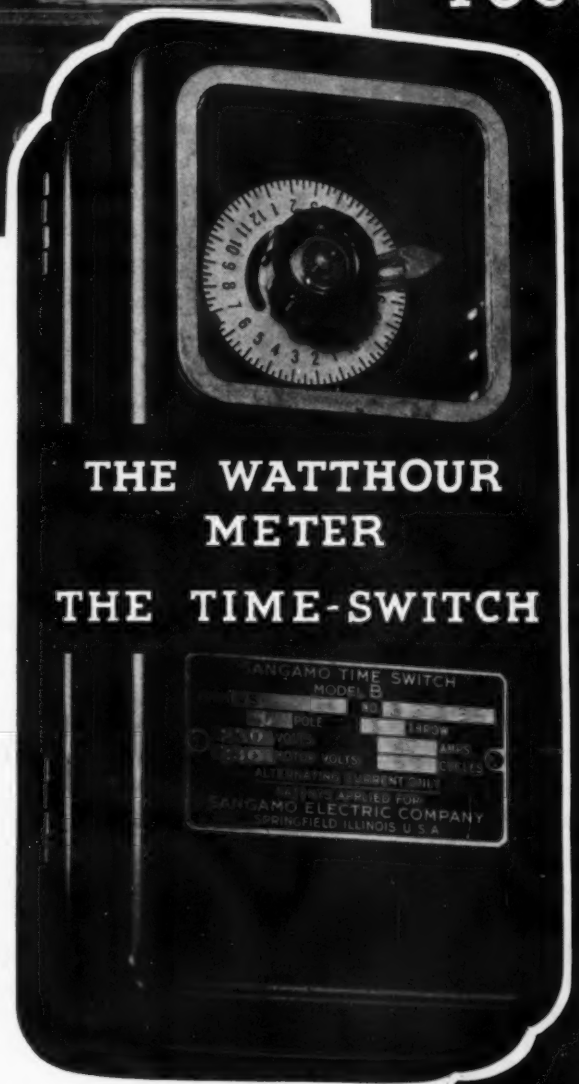
HENRY G. KEPLER

Henry G. Kepler, president of Walker & Kepler, Inc., which at the time of its dissolution three years ago was the oldest electrical contracting organization in Philadelphia, died on January 3 at the age of 79 years.

The company which was organized in 1883 by I. C. Walker, a former Philadelphia representative for Thomas A. Edison, was joined by Mr. Kepler five years later. It wired many of Philadelphia's largest buildings including the Sesqui-Centennial Exposition buildings in 1926.



SANGAMO BACKGROUND THAT ADDS TO YOUR *profits*



THE WATTHOUR METER
THE TIME-SWITCH

The Sangamo background of watthour meter manufacture has a direct effect on your time-switch sales and profits. Here's why. The watthour meter is an accurate, dependable and rugged measuring instrument—it must be—for on these qualities depend the accurate measurement of all electrical energy sold. Sangamo has been building watthour meters with a world-wide reputation since 1899—millions of them.

Time-switches should be made to the same exact limits and of the same fine materials as watthour meters, if maximum life and dependability are to be expected. Thirty-five years of precision instrument manufacture is naturally reflected in all Sangamo products.

This background is your guarantee of satisfaction. See your Sangamo jobber when you need time-switches.

Sangamo Makes These Time-Switches

Type TC. Electrically wound—full jewel escapement—for either alternating or direct current.

Form TW. Moderately priced, direct current Time-Switch.

Form VS. Synchronously motored—equipped with omitting device—for controlling sign or window lighting.

Form VW. Electrically wound with 10 hours reserve, and omitting device—for controlling sign or window lighting.

Form VSO. VS Switch for outdoor installation—supplied with or without window.

Type TCO. TC Switch for outdoor installation—supplied with or without window.

Type TCZ. Equipped with "astronomic" dial—for sign or window lighting.

Form VSZ. Equipped with "astronomic" dial—for sign or window lighting.

Form VSY-VWY. Two circuit time-switches in which sequence may be reversed.

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

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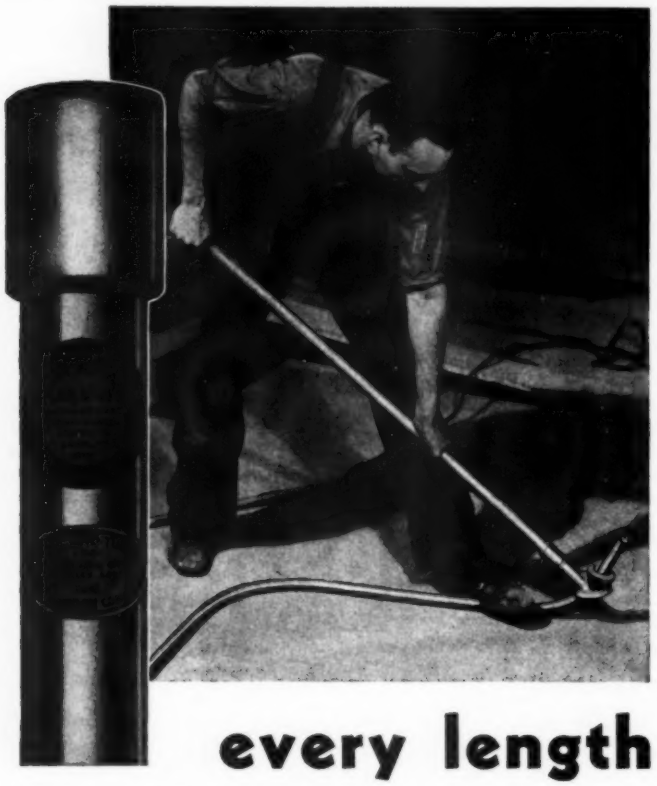


every length
UNIFORMLY
easy to bend . . .

Fretz-Moon Rigid Conduit bends with the same ease at any point in any length. Because it is made from soft, ductile steel, especially made to Fretz-Moon specifications, and then processed by the scientifically-controlled "continuous process," every bit of original ductility remains in the steel.

In this unique and exclusive method of manufacture, every foot of metal is heated to a definite temperature for the same length of time —not an inch is ever over or under heated. Hence, the extraordinarily high ductility of Fretz-Moon Conduit and a total absence of hard or "burnt" spots that might cause kinks in bending.

Comparative laboratory tests and the experience of contractors in the field prove that Fretz-Moon Rigid Conduit bends easier, more uniformly and perfectly without flattening or distortion at the bends. Contractors who give it a fair trial usually become constant users. Write for literature.

STEEL AND TUBES, INC., CLEVELAND, OHIO

EXCLUSIVE SALES AGENTS

FRETZ-MOON
RIGID CONDUIT

A ROLL O' TAPE

ELECTRICAL FLASHES GATHERED AMONG THE BIG WIRE AND PIPE MEN BY ELECTRICAL CONTRACTING'S FIELD EDITORS

LOUISVILLE inspectors claim that all their installations are tested for insulation resistance, as specified in Section 513 of the National Electrical Code. Each inspector carries a "megger" set in his car.

AN INSTALLATION now in progress in a Pittsburgh (Pa.) educational institution includes 20-ft. lengths of 3½-in. conduit. In designing the large exposed feeder conduit racks, some of which comprised 90 conduits, radius bends were made which were too long for standard 10-ft. lengths, therefore these special 20-ft. lengths were employed by the Iron City Engineering Co.

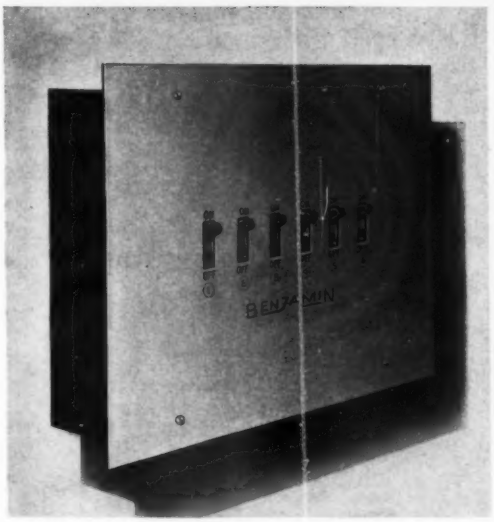
AIR-CONDITIONING projects hold real possibilities, according to A. B. Weinfeldt of the Electric Power Equipment Co., Columbus, Ohio. A local department store installation involved a 550-ft. underground 13,000-volt service, a private substation and two 250-hp. synchronous motors, in addition to the small motors and the revamping of the old power distribution equipment.

THE city electrical department of Kansas City, Mo., is now requiring 60-amp. entrance switches in homes having more than one circuit.

SPECIALIZED adaptation of low-voltage alarm and loud speaker equipment to important factory safety functions has resulted in the Loomis Electric Company doing such work for several large Akron (Ohio) industrial organizations which maintain crews to install all their other plant wiring.

RANGE wiring jobs are given out by the local utility to the members of the Youngstown Electrical Contractors Association under a system of rotation. Drawings are periodically conducted by the association, each member getting ten range wiring jobs in the order that his

In Line With Every Modern Requirement of Safety and Economy . . . . . .



6-POLE FLUSH TYPE NOFUZE LOAD CENTER.

NOFUZE LIGHTING PANEL WITH CABINET.

BENJAMIN

Nofuze Circuit Breaker Panelboards

•

The line includes Load Centers, Lighting Panelboards, Narrow Distribution Panelboards, Convertible Distribution Panelboards and Switchboards, also Dust-Tight Panelboards for Class II, Group G Hazardous Locations.

Main and branch arrangements to meet practically any installation requirement. Boxes, galvanized sheet steel. Fronts, flush or surface type. Trims, finished black lacquer.

New construction and modernization demand nofuze circuit breaker type load centers and panelboards. On your next residence, commercial or industrial wiring job, specify and install these new Benjamin panelboards. It's a sign of a modern and progressive installation.

Send for Bulletin **No. 7**

BENJAMIN ELECTRIC MFG. CO., *Des Plaines, Ill.* New York Chicago San Francisco

BENJAMIN TRADE MARK

FLOODLIGHTS • REFLECTORS • FITTINGS • SIGNALS

UMI

QUAD LIGHTING UNITS

SPADE *Reflectors* MAKE SIGNS CONSPICUOUS

The QUAD Spade Reflector gives straight line cut-off of light—requires a shorter supporting pipe and produces uniform sign illumination.

The newest QUAD Reflector—the Spade—gives a better light—where you want it, too.

The Spade Reflector is so constructed as to give a clearer view of the sign it lights—The smooth rounding surfaces make possible a porcelain enamel finish with a higher resistance to chipping—Streamlined design offers a minimum of surface resistance to wind pressure.

The QUAD Spade is easy to assemble and install. Reflector and socket housing are of one piece metal without seam, weld or joint.

Your next sign job should be equipped with QUAD Spade Reflectors. Write us for details or see your jobber.

The new Type J Bracket has a 40 deg. vertical adjustment, 20 deg. up and 20 deg. down, and in addition, for the first time, a horizontal swing of 180 deg. without moving the bracket. It fully encloses the wire.

The chromium plated projector delivers a longer, broader beam—without streaks or striations and (2) the aluminum wire-enclosing bracket puts the light just where you want it—with only one bolt to tighten.

QUADRANGLE MANUFACTURING CO.
30 So. Peoria St. - - - Chicago

name is drawn, as this order of participation is submitted to the utility. After all members have completed their quota, a new drawing is similarly conducted.

THE problem of expansion in steel structures was a case in point when the Goodyear Zeppelin hangar, or dock wiring, was installed by the Carle Electric Construction Company of Akron, O'hio. This structure attained an elevation of 210 ft. at the roof peak, and registered expansions of from 5 in. to 7 in. Reverse bends were provided in the long conduit runs as compensation.

EMPLOYEE relations are highly developed in the organization of S. J. O'Brien, Inc., New York City. There are over 60 members in the S. J. O'Brien's Employees Association. At a recent get-together dance to which jobbers' salesmen and others were invited the association received over 500 requests for tickets.

HIGH bay wiring did not present a serious handicap to the Hatfield Electric Company when recently installing the main lighting units in a Cleveland auto body factory. Conduit work was done at 60 and 90 ft. above the floor from the top of traveling cranes, thus avoiding the cost of scaffolding.

USED motor stocks involve sizeable investments, therefore the Motor Repair and Manufacturing Co., Cleveland, Ohio, defer the cost of reconditioning most of their used stock of equipment until after it has been sold.

INCOMPETENT persons increased wiring code violations in Newark, N. J., by 74 per cent during 1934 over 1933, according to the annual report of Ralph B. Ward, electrical bureau head of that city. An ordinance is sought that will bar such continued abuses, which in 1934 required 3,295 violation notices to be served by Mr. Ward's bureau.

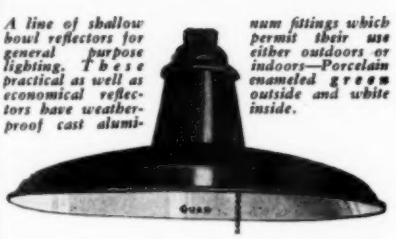
LADDER shipping costs to and from a Columbus (Ohio) retail chain store job made it more advisable for the Post Electric Co., Chicago, Ill., to purchase new ones in that city and then sell them upon completion of the job.

OUTDOOR jobs in midwinter are ticklish contracts, particularly the modernization and rewiring of traffic controls at busy intersections, says E. J. Grafentin, Sterling Electric Co., Omaha, Neb. However in doing several important Omaha jobs this winter all cutting, trenching and backfilling has been reserved from the electrical contract and is being done by FERA labor, thus greatly simplifying the uncertainties of the estimate.

IMPROVEMENTS in direct current voltage in a certain coal mine accomplished a reduction in maintenance cost from 13.8c. per ton to 4.6c. per ton, ac-

QUAD LIGHTING UNITS

BETTER *Modernization* CALLS FOR QUAD QUICK DETACHABLE REFLECTORS



A line of shallow bowl reflectors for general purpose lighting. These practical as well as economical reflectors have weatherproof cast aluminum fittings which permit their use either outdoors or indoors—Porcelain enameled green outside and white inside.

A better modernization job can be done with QUAD Quick Detachable Reflectors. These highly efficient lighting units will not only help you land many jobs through demonstration but will be the source of much repeat business.

Go after industrial modernization work—you'll find it profitable and easy to get with QUAD Quick Detachable Reflectors.

In addition, you'll find QUAD has a line of fittings which are interchangeable and permit the use of both shallow bowl and dome reflectors shown as well as other Q D Reflectors and globe holders—Reflector sizes range from 8 to 16 inches.

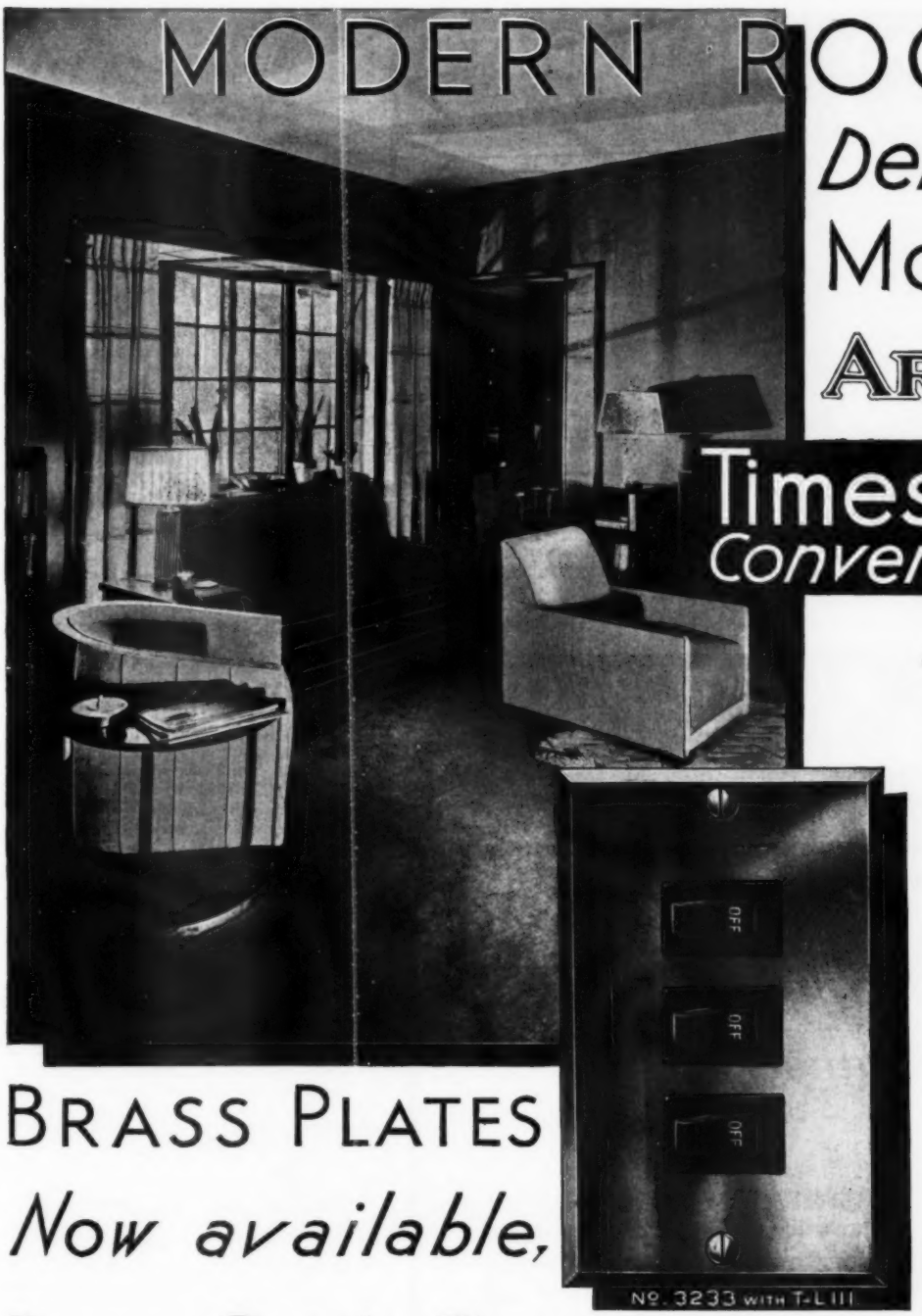
Write for full data on QUAD Reflectors.

The QUAD special dome reflector when combined with three different types of socket fittings provides a wide range of applications. Strongly constructed and weatherproof. Sockets easily wired and reflectors can be quickly attached and removed without disturbing wiring.

QUADRANGLE MANUFACTURING CO.
30 So. Peoria St. - - - Chicago

MODERN ROOMS *Demand* Modern ARROW Timesaver *Convenience*

T-L



No. 3233 WITH T-L III

T-L 61

T-L 611

BRASS PLATES *Now available,* Round Out the Timesaver Line

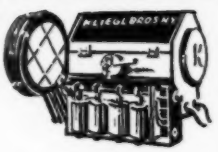
TIMESAVER DEVICES — for every wiring convenience — are now available with Brass Plates in Switches, Switch and Warning Light Combinations. These Plates of struck-up .060 brass are beautifully buffed, extremely durable; a badge of the high-class wiring job. . . The addition of brass plates as an optional feature further rounds out the T-L Line for every place and setting in the up-to-date installation. BAKELITE Plates are illustrated at right, available for the entire line. Illustrated data-sheets — on request — give complete information. * * * * * *

T-L 15

T-L 617

ARROW ELECTRIC DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

BALCONY SPOTLIGHTS
with Remote Control Color Frames



EQUIPPED with an electro magnetic device which permits their complete and entire operation, including the control of four or more color frames, to be accomplished from a remote point . . . a single group of these spotlights will give all the color variations heretofore obtained with several groups; or the same number of spotlights will give four or five times more light for each color than the ordinary type of installation.

This is but one of our many lighting specialties which enable contractors to modernize their installations with a great saving of initial and operating costs. Let us work with you on your next lighting job—our suggestions will be helpful, and you will be sure of getting the best results most economically. *Write for* CATALOG *of our lighting specialties.*

Are you acquainted with this new Junior Kliegl light? It's a remarkable unit applicable for many applications —ask us to send you full details.

KLIEGL BROS
UNIVERSAL ELECTRIC STAGE LIGHTING CO., INC.
Theatrical · Decorative · Spectacular · Lighting
321 West 50th Street · New York, N.Y.

Beating Competition with Brains

Competition is tough in the electrical contracting business these days; and every day it gets worse. Successful contractors have found they can beat fly-by-night competition best by using their brains, and by educating their responsible employees. You can help your head men to keep abreast of the times and save you money by sending each his own copy of ELECTRICAL CONTRACTING.

cording to a paper presented at a recent meeting of the West Virginia Coal Mining Institute. These improvements involved (1) installing an additional 300-kw. converter station; (2) additional feeder cables; (3) increased sizes of rail bonds; (4) reconditioning of motorized equipment and (5) awarding all armature repair work to outside concerns by contract.

PACKING them in—a public demonstration related to electrical safety, as featured in the December issue of ELECTRICAL CONTRACTING was recently conducted in Waukegan, Ill., before 3,200 persons. The guest artists—George Morzfeld, chief electrical inspector, and William M. Peterson, secretary of the fire department, both of Kenosha, Wis.

LARGE estimates prepared by R. D. Speers Co., Davenport, Ia., are bound together with a heavy stapling device so as to keep all sheets intact and in their consecutive order. Perhaps this was suggested by the large catalogues of government dam work details which are supplied for estimating these jobs.

FEMININE estimators are rare personalities, therefore Miss Thelma Russell of E. C. Bennett & Co., pioneer contracting firm of Omaha, Neb., is entitled to honorable mention. E. C. Bennett claims that Miss Russell makes reliable take-offs, and applies her labor units with good judgment.

BERNARD H. (Bernie) VOLM, for the past three years with S. C. Sachs, Inc., St. Louis contractor, as engineer and estimator, is now business manager for the Electrical Contractors' Association of St. Louis. Prior to his connection with the Sachs firm, Mr. Volm was for 20 years with the F. E. Newberry Electric Co. This background and his knowledge of all the contracting angles qualifies him 100 per cent to look after the interests of his organization.

TAXI Service solves the drayage problem in crowded Manhattan for Rudolph Kast & Son. Curtailed volume makes it impractical to own and operate a private truck, therefore smaller motors are placed on newspapers upon the taxi floor and whisked back to the shop for speedy repairs. This involves a reasonable cost to the customer, and keeps the shop overhead down.

PROOF of the benefits derived from home modernization is cited by Gustav Hirsch of the Gustav Hirsch Organization, Columbus, Ohio. Nine old homes that are owned by estates in which this electrical man has a family interest averaged $110 electrical jobs out of the total of $750 spent on each. All are now occupied by responsible tenants who will make the modernization investment pay good returns as compared with a previous long period of vacancies.

UMI

PRACTICAL METHODS

A COLOR CODE FOR WIRING PLANS

Notations added upon blueprints are often difficult to read out on the job, therefore the Paul L. Gilmore Co., Columbus, Ohio, provides a color coded marking method to indicate the sizes of branch conduits which are to be used in roughing-in jobs. Before a job is started the plans are circuited at the office with all branch circuit conduits indicated as nearly as possible to their installed position. All ½ in. runs are traced upon the plan with red crayon pencil, while ¾ in. runs are indicated in yellow lines, and 1 in. runs are shown with orange lines. This plan is followed out in detail between all outlets and distribution centers, except for jobs which are sufficiently large to justify the preparation of separate electrical drawings before starting work. It is claimed that this simple method speeds up job procedure, and in addition safeguards the possibility of errors in conduit sizes.

INCONSPICUOUS PROTECTED OUTDOOR STAGE OUTLETS

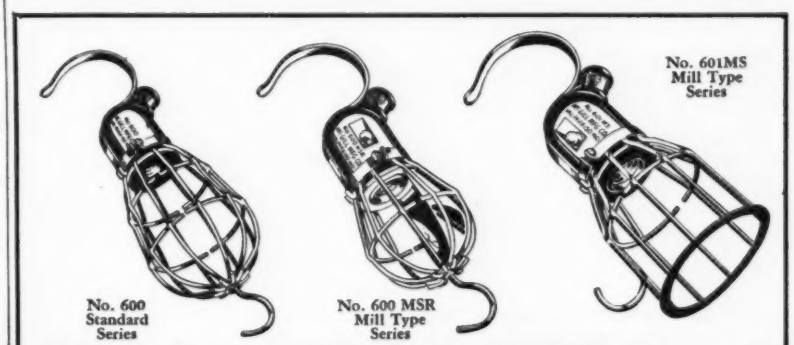
Outdoor stages require outlets to be located in strategic yet inconspicuous places. In the daytime this equipment should not mar the beauty of

a natural setting and should likewise be permanently protected against weather and possible mechanical injury. In wiring an outdoor theatre on the campus of Ohio State University at Columbus, the Gustav Hirsch Organization provided 4-gang

GraybaR

EXECUTIVE OFFICES, GRAYBAR BLDG., NEW YORK

Victor [Friction and Rubber] and Sticka Tapes also Distributed and Guaranteed by Graybar



You Can Sell this NEW Guard

. . . the McGill Hook-Handle Portable

NEW WIDE HOOK

Demonstrate this new feature and increase your portable guard sales. Ask for literature

The portable guard has been modernized and its usefulness **doubled** by the invention of the McGill Hook-Handle Portable. Portable guard users will change to this new guard when you demonstrate how the hook-handle feature permits hanging or wedging the guard almost anywhere to give good light on hard-to-get-at jobs.

Heavy Electric Cage Outlasts Cheaper Guards

Made of Bessemer Steel, electrically welded and cadmium finished, this guard will stand the gaff of the hardest service.

Leviton

McGILL MANUFACTURING CO.

Electrical Specialties of Quality

ESTABLISHED 1904

VALPARAISO · INDIANA

Box 669

Kliegl stage pockets and underground wiring from the control panelboard for various concealed points about the shrubbery. These outlets were for the attachment of floodlights, spots and box lights so as to provide up to 50 ft. candles of stage lighting. Concrete piers were provided to enclose the stubbed-up conduit and stage pocket housings, each pier being capped at its top to form a drip ledge. With the facilities thus provided there is no need of unsightly temporary wiring about the trees or shrubbery, since the equipment can be plugged into receptacles at any desired point that is selected for its own concealment.

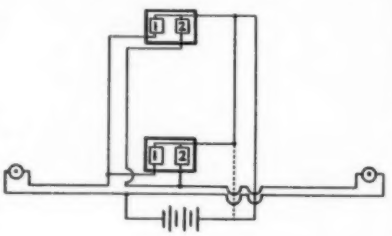
SHOP DRAWING RACK

Large drawings may be hung from their bound ends to save space, expense of storage cabinet, time of unrolling and re-rolling, as well as lessening general wear from being thrown about the office. To do this, two smooth $\frac{1}{4}$ in. by $2\frac{1}{2}$ in. slats, preferably oak, may be bolted to either side of bound end of each set of drawings using 3 or 4 $\frac{5}{16}$-in. stove bolts with wing nuts and washers. This makes a tight, yet easily removable assembly to permit adding special shop drawings, subsequent revisions, etc. Since a paper punch may not be available for making holes in new sets of drawings, the pre-assembled slats and drawings may be clamped into a vise and bolt holes then made in drawings with a twist drill. One end of each pair of slats may be grooved out to a loose fit over $\frac{3}{4}$ in. rack rail, for keeping all assemblies in proper alignment.

The Hatfield Electric Co. have utilized a storage room in their Cleveland office for their drawing rack, having built a $\frac{3}{4}$-in. conduit rack within the room. Ends of conduits are fastened to wall by means of floor flanges. Since the shape and style of rack most suitable to the available space will vary widely, no detailed rack design is submitted.

EQUALIZED ANNUNCIATOR VOLTAGES

Two or more annunciators may easily be paralleled so that equal voltages are available at their various locations. The "common" connection from the annunciator nearest the supply is looped to the one that is located

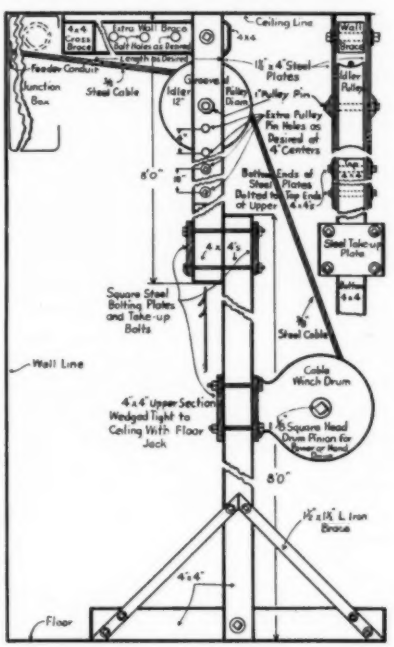


farthest away, then this "common" is doubled back to its supply connection. The cost of the additional wire thus employed is negligible as compared with the advantages which result from having positive multiple annunciator operations as a result of balanced voltage. Unequal voltages often cause unsatisfactory operation when the "common" wire is run the shorter way, as indicated in dotted lines.

POWER DRIVEN CABLE PULLING WINCH

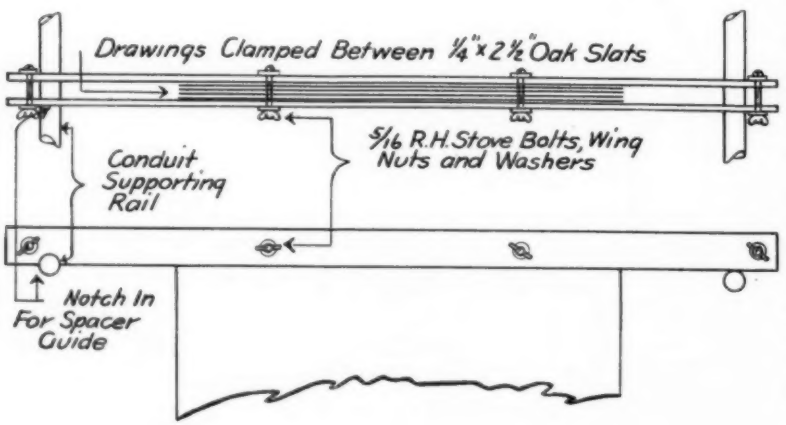
Long runs of feeders 4/0 and larger often occur in groups which warrant a special pulling set-up at switchboards, cable vaults and junction boxes. For such conditions, Porter, Glore & Glass, Inc., Indianapolis, Ind., built a portable rig which permits cable pulling operations by hand or by a portable motor driven pipe threading machine "mule."

Two vertical 4 in. by 4 in. by 8 ft. timbers are clamped together with flat steel plates and $\frac{3}{8}$ in. take-up bolts. The bottom timber rests on a 4 in. by 4 in. floor skid, bolted to the vertical timber and braced with $1\frac{1}{2}$ in. angle iron. The lower timber also has bolted thereto a cable winch drum equipped with an $1\frac{1}{2}$ in. square headed



driving pinion, to receive the driving head of power unit. The top of the upper timber is equipped with two $\frac{1}{2}$ in. by 4 in. by 4 ft. long flat steel plates which are bolted to opposite faces of 4 in. by 4 in. and project vertically to ceiling. A 12 in. diameter grooved cast iron idler pulley is placed between the steel plates, above upper end of top timber revolving on a 1 in. pinion bolted through these steel plates. A 4 in. by 4 in. brace is bolted between and at top ends of the two $\frac{1}{2}$ in. by 4 in. steel plates, this brace being in line with pull. A $\frac{3}{8}$ in. 8,000 lb. test stranded steel cable is used on this rig.

The upper and lower timbers may be slipped apart to any reasonable ceiling height, after which a jack pressure is applied vertically before take-up plates are bolted tight. The wall brace is then inserted at top as a final precaution against any possible ceiling contact slippage during heavy pulling tension. This wall brace timber may rest against wall, cabinet or

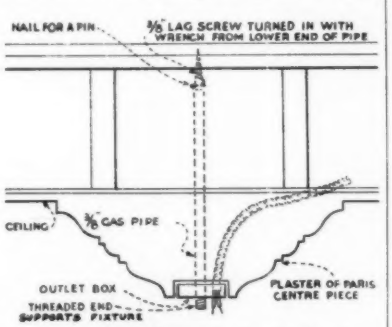

Drawings Clamped Between 1/4" x 2 1/2" Oak Slats
5/16 R.H. Stove Bolts, Wing Nuts and Washers
Conduit Supporting Rail
Notch In For Spacer Guide

an "A" frame, for cleaning the conduit opening, if the latter is necessary. Extra idler pulley pinion holes are drilled in ¼ in. by 4 in. steel plates, thus to permit the adjustment of pulley distance below ceiling. The 4 in. by 4 in. wall brace may also be provided with extra holes to permit a variation in the distance between conduit opening and the rig location.

The contractor claims three men set this rig in 1½ hours, and the same crew (two at reels, one operating motor drive) pulled in a 400 ft. run consisting of three 500,000 c.m. cables in 14 minutes. A precautionary measure to avoid cable damaging pulling tension could be provided by the use of a sensitive adjustable overload relay or circuit breaker, as a part of the motor drive equipment.

SPECIAL FIXTURE SUPPORTS

Suitable supports for heavy fixtures are sometimes difficult to provide in doing modernization work. A method of inserting a lag-screw type


NAIL FOR A PIN
⅜ LAG SCREW TURNED IN WITH WRENCH FROM LOWER END OF PIPE
CEILING
⅜ GAS PIPE
OUTLET BOX
THREADED END SUPPORTS FIXTURE
PLASTER OF PARIS CENTRE PIECE

extension rod through the back of an outlet box and screwing this rod securely into solid wood directly above affords a rigid support for new fixtures. Disturbance to the ceiling finish is reduced, particularly where plaster or other ornamental gingerbread is to be left intact. A ⅜ in. gas pipe of the desired length is fitted up with a lag-screw insert at upper end. The lag-screw head is first sawed off, then a retaining pin hole is drilled through the gas pipe and the stub end of lag-screw, to accommodate a stove bolt or common nail. The lower end of gas pipe is threaded to receive the fixture hickey, and the assembly is then ready for use. A lock-nutted contact with outlet box may be obtained by providing a sufficiently long thread on the bottom end of the gas pipe, otherwise a separate fixture grounding connection would be required within the outlet box and the fixture canopy.

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Use STEELDUCT Hot-Dip Galvanized Conduit on your next job.

SD

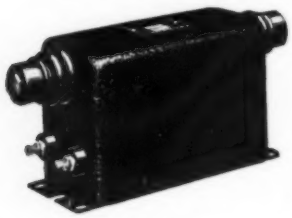
The STEELDUCT *Co.*

YOUNGSTOWN, OHIO

February New Products

Sign Transformer

A line of narrow transformers for luminous tube signs is announced by Jefferson Electric Co., Bellwood, Ill. A 4½ in. wide case made from a single drawn sheet of rust resisting copper



bearing steel is used, this having smooth rounded corners. A galvanized and enameled finish is applied. The core is made of high silica non-ageing steel. The coils are vacuum treated and imbedded in processed compound, which is claimed to insure high dielectric strength and rapid heat conduction, thus insuring operation with slight heat rise. Other features include balanced mid-point grinding, specially processed porcelain bushings, rubber gaskets and simplified mounting brackets.

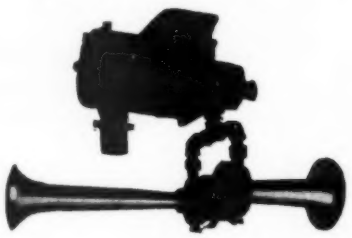
Solenoid Motor Starter

A line of solenoid operated thermal relay motor starting switches including 50 amp. and 100 amp. sizes has been announced by the Allen-Bradley Co., Milwaukee, Wis. Mounting space is claimed to have been reduced without sacrificing wiring space. There is no concealed wiring, all terminals being

plainly marked and accessible from the front of the switches. Flexible leads are dispensed with due to double-break contacts. Completely removable covers are provided while the cabinet interiors are white enameled to reflect light into the working parts and terminals for greater ease in installation and adjustment. Conduit knockouts are provided on all four sides and at the back of cabinets. Each switch unit is mounted upon a back plate for attachment to machine bases or metal cabinets without further insulation. Features in operative design include patented individual arc hood enclosure for each contactor to prevent flashovers from escaping gases and arcs; a disrupting capacity ten times the maximum rated current at listed voltage; silver alloy contacts; low pickup and drop-out voltages; self insulated switch assembly, and soldered ratchet type thermal overload relays, arranged for resetting without opening the cabinet. These switches will handle motors up to 15 h.p., 110 volts; 30 h.p., 220 volts and 50 h.p. 440/550 volts.

Electric Air Horn

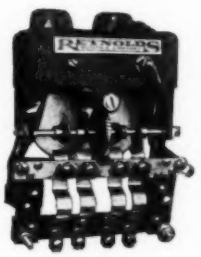
A motor-driven air horn has been developed by the Federal Electric Co., Chicago, with which a penetrating and powerful signal can be sounded without employing steam or compressed air piping. Sound is produced by a vibrating-diaphragm compressed air horn which is directly attached to a special type motor driven air compressor. The motor is claimed to be of a highly accelerated heavy duty type. A relay



supplied with this horn may be connected into fire alarm, paging and other signalling systems. Code signals of one to two seconds per impulse may be sounded with this horn. This device can be furnished for 12, 24 or 32 volt storage battery, or for 110 and 220 volt a.c. or d.c. supply.

Small Motor Condensers

A line of oil-filled and electrolytic condensers for fractional horsepower condenser-start motors is announced by Aerovox Corporation, Brooklyn, N. Y. These units are available to contractors in the replacement of earlier types of such equipment in electric refrigerators, oil burners and other household appliances. The electrolytic types are available in a variety of styles or shapes of leak-proof containers, with or without insulating jackets and a choice of terminal arrangements and capacities. Internal parts are of aluminum, hermetically sealed to prevent evaporation or absorption and to assure a stable long-life content. Oil filled units are intended for condenser-transformer motors and power factor correction. Containers are likewise available in a wide variety of shapes, sizes and terminal arrangements, and encase a hermetically sealed, dehydrated, oil-impregnated section in oil bath. The expansion and contraction of section under a varying load is claimed to provide cooling action to permit of heavy continuous service.

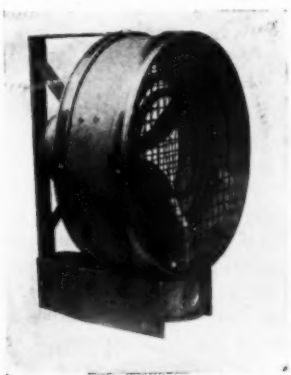


Flasher

A silver contact flasher, series "E" and "J," disc motor drive and adjustable speed, is announced by Reynolds Electric Co., Chicago, Ill. Flasher is made with either one, two, three or four switches, pure silver contacts, 5 to 240 flashes per minute. Flasher is made for 2-wire service, but can be made for 3-wire as well as double pole. Operates on a.c. 110 volt and 220 volt, 50 to 60 cycles in two sizes: 500 W. and 1000 W. per circuit, 450 v.a. and 900 v.a. Unit is small in size, has convenient terminals and has composition bearings with lifetime lubrication.

Electric Heater

A line of 1½ to 4 kw. electrical element unit heaters, designed for 115 to 230 volt service, is announced by Harold E. Trent Co., Philadelphia, Pa. Available in two



types, SLF stationary as shown, or SLP for portable use, these heaters are claimed to assure even temperature with maximum efficiency because of a tubular type helical heating element being used in front of a quietly operated fan. The fan is rated at 450 c.f.m. for units of 2 kw. and less, and 650 c.f.m. for 3 and 4 kw. units. A thermal cutout is provided which operates in case the fan motor should stop. The range in weight of these units is 9½ to 18 lbs., while maximum dimensions are 12½ in. high, 11 in. wide and 8½ in. deep. Certain units may be supplied for 3-phase circuits and all are available with an additional temperature control feature.

Manufacturers News

N.E.M.A. LOOKS FOR 10 PER CENT BUSINESS IMPROVEMENT

"The electrical manufacturing industry may expect an improvement in business in 1935 as compared with 1934 ranging from 'next to nothing' up to 20 per cent, depending upon the chief line of products of each individual company, according to a statement made by Frank C. Jones, president of N. E. M. A. In general, the feeling among members of the executive committee of N. E. M. A., Mr. Jones stated, is that the industry may look for an average increase of 10 per cent.

The Wiremold Co., Hartford, Conn., announces the appointment of Walter S. Beckett as district sales manager for eastern Pennsylvania, southern New Jersey, Delaware, Maryland and District of Columbia, with headquarters at 323 West Apsley St., Germantown, Pa. Mr. Beckett has been engaged in the sale of Wiremold products for fifteen years.

A 4-page leaflet entitled "Lead Encased Building Wires and Cables" has just been released by General Cable Corporation, 420 Lexington Ave., New York City.

Wolverine Tube Company, Detroit, Mich., announces the appointment of D. J. Baker, 823 Clermont St., Dallas, Tex., sales representative to handle the sale of Wolverine soldering lugs and splicing sleeves in Texas, Oklahoma and Arkansas.

Dante Electrical Manufacturing Co., Bantam, Conn., has released trade price sheet No. 35-A, which illustrates this company's line of soldering and solderless lugs, sheet metal terminals, fuse clips, fuse puller and plug fuses. Net prices are given for certain listed items.

Bulletin No. 1010 has just been announced by Appleton Electric Company, Chicago, covering a new line of dead-end circuit breaking plugs and receptacles.

The Universal Motor Company, Oshkosh, Wis., announces the appointment of J. Kenneth Focke as industrial and sales engineer in its electric power and lighting plant division at Oshkosh. Mr. Focke has for the past ten years been active in industrial engineering and sales work.

General Electric Company, Schenectady, announces the appointment of R. M. Spurck as manager of sales in the circuit breaker section of the switchgear sales division at Philadelphia. Mr. Spurck has been with the company since 1910. H. E. Starbuck has been appointed general assistant in the switchgear sales division.

A booklet entitled "The Brush Phase of Motor Maintenance" has been prepared by the Ohio Carbon Co., Lakewood, Ohio, which deals with causes and cure of sparking, ex-

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New Manager for Electrical Contracting: Glenn W. Sutton has been appointed manager of ELECTRICAL CONTRACTING and *Electrical Wholesaling*. Since graduation from Cornell in 1918 Mr. Sutton has been engaged in some phase of the publishing business, having for a number of years owned and published *Petroleum Age*. In 1926 he became district sales manager for the Gage Publishing Company on *Electrical Record, Electrical Manufacturing and Electrical Specifications*. Four years later he joined the sales staff of Electrical Trade Publishing Company as eastern manager for *Electrical Wholesaling* and ELECTRICAL CONTRACTING.

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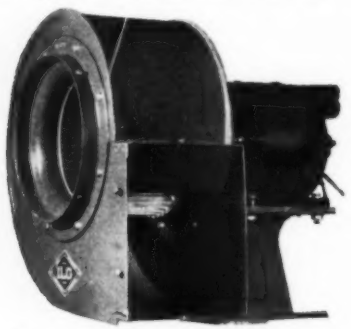
235

February New Products

Blower Fan

A series of type "B" volume blowers in five sizes is announced by Ilg Electric Ventilating Co., Chicago, for use in various ventilating and drying jobs where quiet and smooth running is required. These blowers are made in different speeds with free air capacities ranging from 180 c.f.m. to



2100 c.f.m. and ranging to 1½ in. static pressure. A press formed steel housing is mounted in a cast iron base, employing an inlet flange of cast iron. A dynamically balanced die cut multiblade wheel is mounted directly on the motor shaft. The motor is placed on the cast iron base. These blowers are supplied for a.c., single or three-phase, or d.c., at any common voltage. Shipping weights range from 45 to 225 lbs.

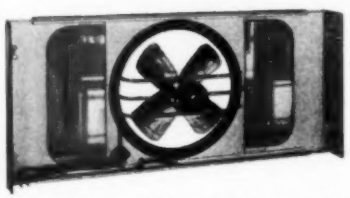
Three-Light Pull Socket

A porcelain pull socket for mogul base three-light lamps which has a rated capacity of 1500 watts, 250 volts is announced by the Bryant Electric Co., Bridgeport, Conn. This socket is designed particularly

for use with torcheres and floor lamps where a combined socket and switching mechanism is of greatest advantage. The pull switch operation sequence is 1, 2, 1 and 2, "off." Due to the frequency of switch operations employed for such duty, the adequate wattage capacity of this pull socket is claimed to be a manufacturing feature in what is considered the first device of this type to be offered to the trade.

Kitchen Ventilator

An adjusable ventilating fan unit of 600 C.F.M. capacity, styled Wind-O-Vane, Jr., is announced by B. F. Sturtevant Co., Boston, Mass. Glass panels are used for the adjustable mounting feature to accommodate three different ranges in window widths, namely 20 in. to 26 in., 26 in. to 36 in. and 36 in. to 50 in. The motor mounting is designed to reduce noise and vibration, and is provided with chromium finished plates and supports. This fan is primarily for kitchen ventilation, but may also be adapted



to small offices and other small areas where the volume of air to be handled is not too large. The metal parts of the adjustable panel are finished in buff enamel baked on, while the ring and motor are glossy black enamel. An "on" and "off" pull switch with pull cord and a connecting cord with attachment plug complete the assembly.

Lighting Plant

The 1935 line of gasoline operated lighting plants in 300, 500, 1,000 and 2,000 watts capacity is announced by D. W. Onan and Sons, Minneapolis, Minn. A modernistic streamline design of unit construction has been adopted, with generator mounted directly at the crank case of the engine. Flickerless 60-cycle,110-volt alternating current output is claimed. A four cycle air-

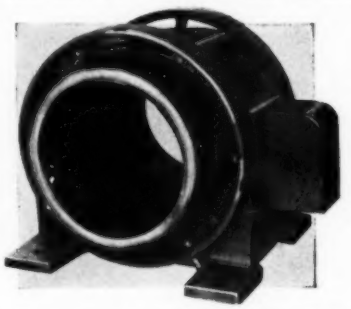
cooled engine is employed, using 6-volt ignition, float feed carburetor, mechanical governor, 6-volt starting motor and storage battery with remote control for self-starting. Standard readily available parts are claimed to have been used throughout. Quiet operation and the elimination of all vibration are other features claimed through a dynamically balanced engine, a socket base for rubber mounting, and extra silent muffler.

Indicating Plug Fuse

A line of "Sho-Blo" indicating plug fuses is announced by the United States Electric Manufacturing Corp., New York City, as an addition to its Usa-Lite products. Fuses that are in good condition show the letters "O.K." within the window fuse top, while the letters "N.G." are shown as soon as the fuse blows. This indicating lettering is bordered by distinctive colors in the remainder of the fuse window space so that each of the five fuse sizes may be readily distinguished. Shock-proof grip handles are provided at the top of each fuse for greater ease and safety in insertion and removal. Sets of five fuses are supplied upon a card holder which has a folding paper cover with a punched hole at the top for convenience in hanging spare fuses next to the customer's fuse cabinet.

Seal-Clad Motors

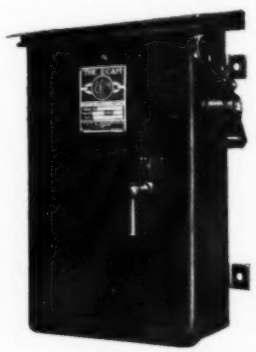
Permanent coil protection is claimed for "Seal-Clad" open type squirrel cage motors of the Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Hard, smooth, Bakelite



shields are sealed over the stator coils for protection against metallic dust, grit, oil, moisture, mild acids and other agents injurious to insulation. They are built in ratings up to 25 hp. 1800 r.p.m. and suited to a much broader range of application than the ordinary open motor. "Seal-Clad" motors have cast-steel frames; twistless and distortionless stators; silver-brazed, indestructible rotors, oil and dust-tight sleeve or anti-friction bearings.

Type A Safety Switches

A line of weatherproof dust-tight type A safety switches in standard sizes from 30 amp. to 600 amp. capacity is announced by The Electric Controller & Mfg. Co., Cleveland, Ohio. These switches are equipped with fully interlocked door, making it impossible to operate the switch with the door open, or to open the door with the switch closed. They are enclosed in a 10-gauge steel cabinet which has been rust-proofed by bonderizing before the enamel is applied. A heavy sponge rubber gasket makes a tight seal between the door and cabinet. Features claimed for these switches are compactness, narrow width, light weight (due to steel instead of cast enclosures),



semi-floating, double break V-blades, V-stationary contacts backed up with steel springs which guarantee full contact under heavy pressure.

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cessive wear, etc., of brushes, commutators and slip-rings of d.c. and a.c. motors and generators. Diagrams are included in this booklet to explain the conditions of sparkless running and the effects of the applied load upon them. Other sections deal with brush characteristics, selection and manufacture, and suggestions for maintenance.

HARRY C. GOLDRICK

Harry C. Goldrick, merchandising manager of the Los Angeles office of the Graybar Electric Company, died January 9th at the age of 58. Mr. Goldrick was just beginning his nineteenth year with the Graybar Company, having worked in the New York City, Syracuse, Chicago and San Francisco offices prior to his Los Angeles duties. From 1905 to 1915 he was connected with the Kellogg Switchboard and Supply Company and held the position of sales manager at the time he joined the Graybar organization.

Van Cleef Bros., Chicago, Ill., announces the appointment of The Service Sales Corporation of Boston New England representatives of its products. A complete stock of Van Cleef products will be warehoused at 52-54 Brookline Ave., Boston.

A new lighting equipment catalog, No. 35-L, has been released by the General Electric Supply Corporation, Bridgeport, Conn. Comprising 192 pages, this catalog contains a widely selected and carefully arranged listing of equipment for commercial, industrial and floodlighting requirements, including fittings and accessories for the assembly and installation of lighting fixtures. A thorough description of the cataloged items is supplemented with illustrations, sketches and various tables for calculating special layouts. A plainly worded introductory section explaining the science of seeing covers 14 pages. One of these pages treats with a practical analysis of adequate wiring for good lighting.

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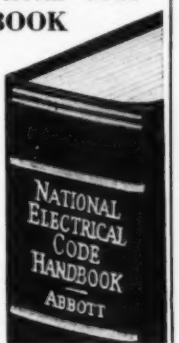

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Arrangement groups rules according to jobs they cover; makes you sure no requirement has been overlooked on a given job. Contains many explanatory comments, diagrams, sketches, etc. Covers simplified application of Code data on motor installations, special requirements for outside work, hazardous locations, emergency lighting, high-voltage installations, etc.

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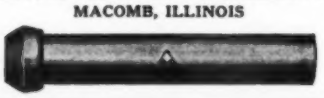

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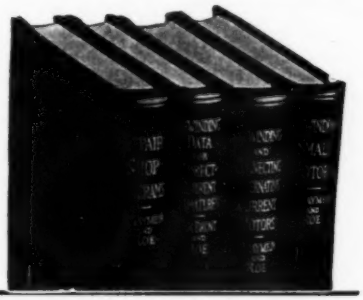

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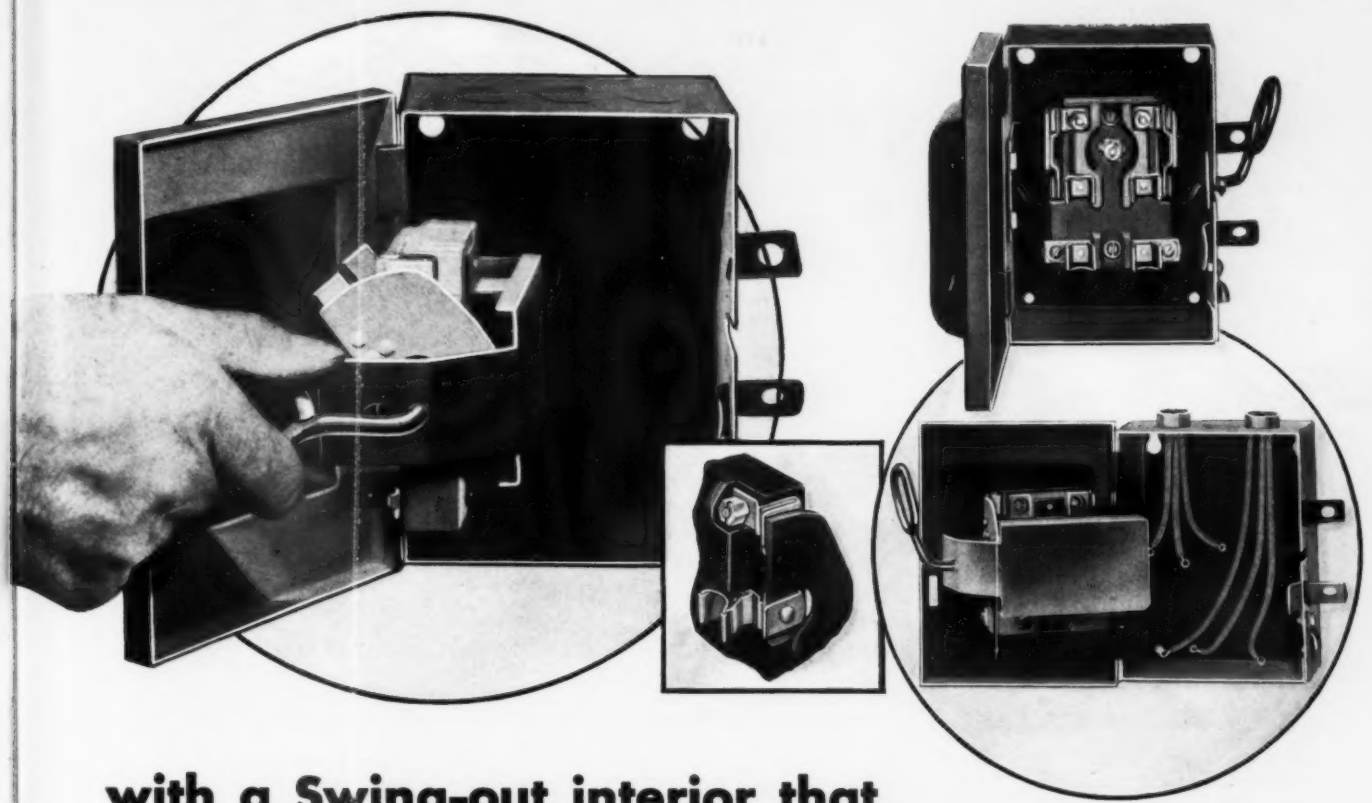

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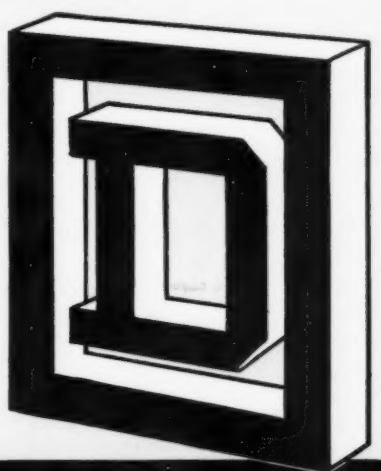

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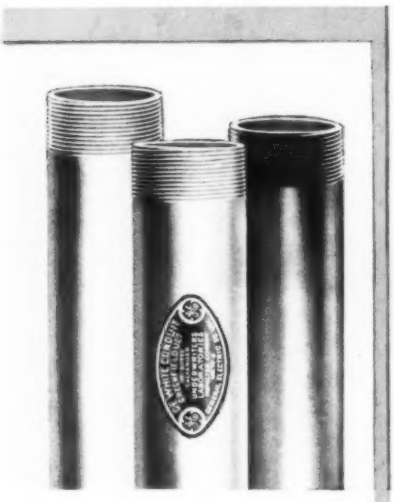

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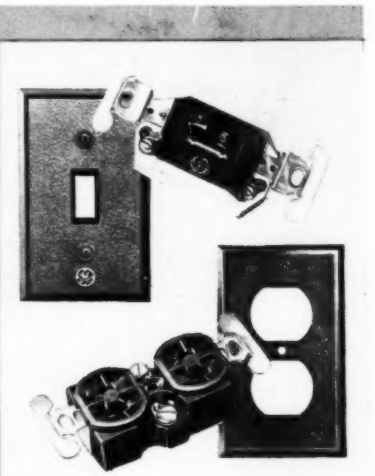

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